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# USSR Report

MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

No. 7, July 1984

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27 November 1984

USSR REPORT  
MILITARY AFFAIRS

## AVIATION AND COSMONAUTICS

No 7, July 1984

Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow.

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KUZOVOV STRESSES 'INTERNATIONALIST' INDOCTRINATION OF AIR FORCES PERSONNEL

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 1-3

[Article by Lt Gen Avn Vladimir Il'ich Kuzovov, first deputy chief, Air Forces Political Directorate: "Developing Patriots and Internationalists"]

[Text] Intensive combat flying training is in progress in the line units. At airfields, ranges, and in practice areas Soviet military pilots, standing shoulder to shoulder with their brothers in arms -- aviation personnel in the armed forces of the socialist countries -- are working persistently to hone their flying skills and air proficiency, striving toward high-quality accomplishment of training plans and schedules and to meet ambitious socialist pledges. It is for good reason that their thoughts and deeds are presently focused on accomplishing these important combat training tasks.

The foreign policy of the Soviet Union and its allies is directed toward lessening international tension and preventing war, emphasized USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU CC Politburo, in his speech at the dedication of a memorial in Ryazan to the Soviet-Polish brotherhood in arms. This policy was clearly formulated in the Prague Political Declaration and confirmed at the Moscow Conference of leaders of seven socialist nations as well as at a number of other joint forums. The aggressive forces of imperialism, however, are building up armaments in Western Europe and other parts of the world and are making preparations for another world war. In these conditions the growing fighting, internationalist unity of the armed forces of the Warsaw Pact nations, the 30th anniversary of which will be officially celebrated in May 1985, constitutes a reliable guarantee of international security, peace, and progress by mankind.

V. I. Lenin, founder of the Communist Party of the Soviet Union and the Soviet State, taught that in the struggle for revolutionary reorganization of the world and to bring to an end a system of hired slavery and man's exploitation of man, the workers, whatever their nationality, have a common class enemy -- the world bourgeoisie and imperialism. The great leader of the toilers warned that the imperialist bourgeoisie would endeavor to unify its forces in order to make common cause in destroying the achievements of the socialist revolution wherever it takes place. Nor will the imperialists limit themselves to using solely economic, political and ideological means of

weakening and destroying the new system but will endeavor to achieve their goals by means of arms. This is why the socialist revolution must be able to face the class enemy, who is armed to the teeth, with invincible military might. Peoples which have taken the path of socialism, wrote V. I. Lenin, need a close military and economic alliance. A successful struggle against international imperialism and defense against its aggressive aims are impossible without such an alliance.

Lenin's ideas on the unity of peoples in defending the cause of the Great October Socialist Revolution and on the internationalist character of the military organization of the new society are genuinely embodied in the Soviet Armed Forces. A most important feature of this army of a new, socialist type was the fact that it was formed as an army of brotherhood and friendship among the peoples of the USSR, became tempered and strengthened on the ideals of proletarian internationalism.

Of great importance for defense of the Soviet Republic was the establishment of international military units in the Red Army. Thousands of internationalists fought for the shining ideals of the revolution in its ranks: Poles, Romanians, Bulgarians, Germans, Hungarians, Yugoslavs, Mongols, Czechs, and members of other peoples. The men of the international units made a worthy contribution to the victory by our country's toilers in the Civil War.

The USSR in turn time and again rendered effective assistance to international revolutionary forces which were fighting for social and national liberation. Soviet internationalist-aviators covered themselves with unfading glory in these clashes with fascists and imperialists of every hue and shade.

When the Soviet Union first declared its resolve to defend the young Spanish Republic, 160 Soviet volunteer pilots departed for that country heeding the call of their heart, in the name of fraternal solidarity with a peace-loving people. Joining international brigades, they fought heroically against the unified forces of German, Italian, and Spanish fascism, defending the honor, freedom, and independence of the Spanish people. N. Balanov, G. Prokof'yev, P. Rychagov, G. Tkhon, V. Khol'zunov, and many others distinguished themselves in these battles. In November 1936 alone 140 Soviet aircraft took part in fighting in the skies over Madrid.

Many aviators were awarded government decorations for successfully accomplishing combat missions, for bravery and heroism, and 31 pilots were awarded the title Hero of the Soviet Union. The antifascist struggle in Spain was a bright example of international solidarity of democratic forces.

Enormous assistance was rendered to the workers and peasants of China, who were struggling against domestic counterrevolution and Japanese invaders. Many Soviet military volunteers, including pilots, took part in this liberation struggle. F. Polynin, T. Khryukin, G. Kravchenko, S. Gaydarenko, and S. Suprun fought bravely. A. Gubenko rammed an enemy aircraft.

In May 1939 the Japanese Army commenced combat operations against the Mongolian People's Republic. Soviet combat pilots improved their fighting skills in the skies over Mongolia. They gained victories over the vaunted Japanese pilots in group and one-on-one engagements. V. Rakhov, for example, fought more than 20 engagements in 2 months time and personally downed 7 Japanese fighters. V. Skobarikhin, encountering more than 30 I-97 aircraft, boldly joined battle.

Sixty Soviet pilots were awarded the title Hero of the Soviet Union for courage and bravery displayed in combat on the Khalkhin Gol River, while S. Gritsevets, G. Kravchenko, and Ya. Smushkevich were our country's first to be twice named Hero of the Soviet Union.

Soviet fighting men, including aviators, demonstrated unswerving faithfulness to their international duty during the years of the Great Patriotic War. Engaged in a severe, bloody struggle, they not only defended the freedom and independence of their multiethnic homeland but also liberated a number of countries from the German-fascist and Japanese invaders. Hundreds of thousands of sons and daughters of the Soviet homeland were awarded combat decorations for courage and valor. Those among them who were awarded the highest honor -- the title Hero of the Soviet Union -- included members of more than 100 nationalities and ethnic groups in the USSR.

Patriotic forces of a number of European countries established their own liberation armies during World War II, armies which successfully smashed the common foe shoulder to shoulder with the Soviet Armed Forces. French pilots of the Normandy-Neman Regiment, Polish and Czechoslovak pilot volunteers, as well as Romanian and Bulgarian aviators following the liberation of Romania and Bulgaria, flew wing to wing with Soviet aviation personnel, actively battling the Hitlerite invaders.

History shows that imperialism responds to its defeats in social battles by intensifying reaction across the board. Attempting to preserve its self-proclaimed right to determine the fate of peoples and to determine the development of world events as it sees fit and from a position of strength, since 1945 it has continued material preparations for another war and has stepped up ideological sabotage. Invasion of Lebanon and occupation of Grenada, an undeclared war against Nicaragua, threats against Syria, and transformation of Western Europe into a launching pad for U.S. first-strike nuclear missiles targeted against the USSR and its allies -- these are merely a few recent events which confirm intensified efforts by the forces of imperialist aggression and reaction.

In present-day conditions the Soviet Armed Forces and the armies of the brother socialist countries are bearers of high ideals of a fighting alliance, are an embodiment of socialist internationalism and a bulwark of peace and social advance. "...Whenever it is required by the interests of national security and defense of peace, when it is necessary to assist victims of aggression," it was noted in the documents of the 26th CPSU Congress, "the Soviet serviceman is perceived by the world as a selfless and courageous patriot and internationalist, ready and willing to surmount any and all difficulties."

The Soviet serviceman who came to the assistance of the Afghan people was viewed by the entire world precisely as such a patriot and internationalist.

This spring the toilers of our friend and neighbor Afghanistan celebrated the 6th anniversary of the April Revolution. A process of democratization is in full progress in that country. The toiling people have become the true master of their country. But imperialist circles in the West and their stooges are unable to come to terms with this fact. They have unleashed an undeclared war against the young republic. Attempting to topple the existing system, they are infiltrating onto the territory of the DRA trained bands of saboteurs and terrorists, armed to the teeth with U.S. and British weapons. Faithful to its internationalist duty, the Soviet Union is giving aid to Afghanistan both in peaceful construction and in organizing defense of the achievements of the revolution.

The following incidents are memorable. Not far from the border from Pakistan, a battle erupted between subunits of Afghan troops and a large band of counterrevolutionaries which had infiltrated from abroad. It became necessary to deliver medical and food supplies to this area as quickly as possible and to evacuate wounded. Soviet and Afghan helicopter crews successfully accomplished this mission.

On another occasion, when a dushman [enemy, bandit] detachment surrounded in the mountains a small group of defenders of the revolution and was making ready to wipe them out, once again Soviet helicopter crews came to the aid of the Afghan patriots.

There are many such examples of fraternal solidarity. It is these incidents which reveal in full measure the finest qualities of Soviet flier-internationalists. In spite of difficulties and at times mortal danger as well, they always honorably carry out their flight assignments and in so doing display courage and heroism as well as the highest degree of professional skill. V. Gaynutdinov, V. Shcherbakov, Ye. Zel'nyakov, V. Kot, and V. Pavlov, who have been awarded the title Hero of the Soviet Union, accomplished remarkable deeds in the skies over Afghanistan. Many of our patriot-internationalists have been awarded Soviet and Afghan medals and decorations. Young Communists and Komsomol members officers I. Orlov, A. Moshayev, A. Lavrenko, and other aviators are included among those who have distinguished themselves. CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, spoke of them with warmth and sincerity at the Armed Forces Conference of Komsomol Organization Secretaries: "Our military Komsomol is dedicatedly preserving and building upon the outstanding traditions of their fathers. The fact that Komsomol members in the military are carrying out their internationalist duty today with honor constitutes solid evidence of this."

Thanks to the internationalist assistance by the Soviet Union to the Democratic Republic of Afghanistan, the plans of aggressive imperialist circles to wipe out the achievements of the April Revolution in that country have failed.

The growing military threat proceeding from reactionary imperialist circles is forcing our party and the brother Marxist-Leninist parties of the socialist countries to concern themselves with strengthening the defense capability of their countries and the entire socialist community, to maintain fighting strength and troop combat readiness at an adequate level. "But as long as military and political tension continue to exist, as long as our country is endangered by a nuclear missile threat on the part of the United States and the NATO countries," noted CPSU CC General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, in his speech at a get-together with the workers at Moscow's Serp i Molot [Hammer and Sickle] Metallurgical Plant, "we must keep our powder dry and be constantly alert to ensure that the balance of power does not shift in favor of imperialism and that we do not prove to be weaker."

Soviet aviation personnel, together with the servicemen of the other branches of the Armed Forces, are performing their honorable and responsible duty to defend the interests of the homeland and the nations of the socialist community. Concern by the Communist Party with indoctrinating our winged warriors in the finest revolutionary and fighting traditions of the army and navy and with furnishing our Air Forces with modern aircraft and weapons promotes unswerving moral-political, social and internationalist solidarity on the part of Air Forces personnel and their total dedication to the party cause.

As we know, in a modern nuclear missile war, if the imperialists start one, combat actions will be of a collective [crew-served] nature more than at any time in the past. This factor is taken into account in the aviation personnel combat training plans and schedules employed by the allied armies of the socialist nations. They incorporate a large number of diversified, jointly-conducted combat and political training activities.

This work takes on particular significance in the aviation units deployed on the front lines of the defense of socialism. It is precisely here, in the course of joint exercises, other training activities, and exchange of experience and know-how in combat application that the winged defenders of the nations of the socialist community gain an understanding of the laws of friendship and mutual assistance and learn to function together in combat. This is a characteristic feature of the present stage of the fighting alliance of the military forces of the Warsaw Pact member nations. For this reason commanders, political agencies, party and Komsomol organizations of the air forces of the groups of forces view work in the area of internationalist indoctrination and strengthening friendship with the toilers of the socialist countries and fighting cooperation with the men of their military forces as an integral component part of Communist indoctrination of aviation personnel and the campaign to achieve a high degree of combat readiness.

For example, according to established tradition the political department of air forces of the Group of Soviet Forces in Germany discusses each year, jointly with the political directorate of the Air Forces and Air Defense Forces of the National People's Army of the GDR, matters pertaining to internationalist indoctrination of military personnel, with consideration of assigned combat missions and political training tasks, as well as measures

carried out in the interests of the armed forces of the Warsaw Pact member nations. Joint plans and schedules specify such items as formulation of common views on organization of personnel combat training, mastery of aircraft equipment, the campaign for flight safety, establishment of training facilities, etc. Councils for internationalist indoctrination have been set up in the units.

A vivid evidence of the steadily growing combat partnership among aviation personnel of the brother armed forces is joint tactical air exercises and various kinds of training activities in classrooms and on simulators, where Soviet and German pilots exchange experience and know-how in aircraft operation, and work to master the most effective techniques and modes of conduct of aerial combat. Joint actions, close contacts in performing combat training missions, and mutual assistance in flight-readying weapons and equipment develop excellent moral-fighting qualities in the personnel of the military forces of both countries and promote increased combat readiness on the part of aviation units and subunits. In addition, such measures strengthen the bonds of friendship and brotherhood in arms of the Soviet and German aviators.

Considerable positive experience in this important area has also been amassed in the air forces of other groups of forces. In the Central Group of Forces, for example, on the eve of joint tactical air exercises the pilots of the allied armed forces visit one of the communications and flight operations radar support units of the Czechoslovak People's Army or air forces of the Central Group of Forces, become acquainted with the specialist personnel and observe them at work. This helps ensure that in the course of a tactical air exercise Soviet and Czechoslovak pilots accomplish crucial missions with sureness and precision under difficult conditions.

Get-togethers and exchange of job experience and know-how by aviation engineer service specialist personnel of the air forces of the Central Group of Forces and Czechoslovak People's Army have become traditional in the process of mastering modern equipment. As a result, during tactical air exercises the men of the brother armed forces display finely-honed skills, surpass performance standards in readying aircraft equipment for sorties, and do not commit culpable errors producing potential air-mishap situations.

The combat partnership between aviation personnel of the Central Group of Forces and the Polish Army is also characterized by a diversity of forms and content. Get-togethers of commanders, political workers, and party activists are held on an extensive basis, at which they exchange experience and know-how in the area of mastering aircraft equipment and modes of its combat employment, and achievements in the area of ensuring flight safety and organization of socialist competition on assigned tasks and performance standards. And this experience is reinforced in the sky and on the ground during performance of combat training missions. This year they have widely followed the practice of holding contests between Soviet and Polish pilots in speed of interception of an "aggressor" aircraft as well as accuracy and precision in hitting small ground targets.

There is currently taking place a broadening of competition among the young aviation personnel of both countries to honor in a worthy manner the 40th anniversary of the Polish People's Republic and the approaching 40th anniversary of victory by the Soviet Armed Forces in the Great Patriotic War.

Scientific and practical conferences and seminars, at which aviation personnel of the allied armies study the major issues of Marxism-Leninism -- perpetually-pertinent internationalist teaching -- exchange views on various issues of the present day, and discuss the most effective forms and methods of conduct of ideological and political indoctrination work, have proven quite effective.

It is for good reason that Comrade W. Jaruzelski, speaking about the history of the early development of the friendship between the two brother armed forces at a political rally to dedicate a monument to the Soviet-Polish brotherhood in arms in Ryazan, stressed that the heartfelt, everlasting memory of those days when Polish-Soviet friendship was born, when the Communists of both peoples were building the foundation of a new era in the history of our relations, will never be effaced.

Aviation personnel of the Southern Group of Forces also conduct, jointly with their brothers in arms -- the fighting men of the Hungarian People's Army -- similar work forms and methods pertaining to internationalist indoctrination of personnel. The job proficiency of personnel improves and the class unity of the citizens of our countries becomes stronger in the course of this work.

It is being conducted in a genuinely vigorous, purposeful and effective manner in the collectives led by officers Ye. Belyakov, Ye. Zaytsev, V. Azarov, A. Parsin, B. Kushcheruk, A. Yakovlev, and others.

It is essential to note the fact that many interesting and instructive work forms pertaining to patriotic and internationalist indoctrination of aviation personnel are also practiced by the air forces of the districts. They are successfully utilized by commanders, political agencies, party and Komsomol organizations to improve the quality of combat training and to strengthen discipline and organization.

We must state, however, that in some line units matters pertaining to indoctrinating aviation personnel in the ideals of Soviet patriotism and proletarian internationalism are not adequately emphasized in work pertaining to ideological-political and moral indoctrination of personnel. In some aviation units of groups of forces, these matters are unfortunately raised from occasion to occasion, and sometimes work is stepped up only during the conduct of joint tactical flight exercises by aviation personnel of the allied armies. It is of an irregular, "seasonal" nature in certain other places where the capabilities of officers' clubs, clubs, libraries, and other propaganda and agitation centers are not always and not adequately utilized in this important activity.

An important task proceeds from this: political agencies, party and Komsomol organizations, together with local party and soviet bodies, should utilize for patriotic and internationalist indoctrination of aviation personnel not only

methods of ideological and political indoctrination work which have proven effective but should also seek new forms and methods of such work and make use of all technical means of propaganda, as is demanded by the proceedings of the June (1983) CPSU Central Committee Plenum.

Summer combat training is currently in full swing in Air Forces units and combined units. Carrying out the demands of the Communist Party and Soviet Government and the instructions of CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, on defense matters, commanders, staffs, political agencies, party and Komsomol organizations are placing main emphasis in their political and organizational work on thorough and comprehensive explanation to personnel of their patriotic and internationalist tasks, on mastery of complex aircraft systems, and on devising the most efficient modes of their combat employment, on training pilots, navigators, and crews to take bold and determined actions for the sake of defense of the homeland.

This is also fostered by purposeful party-political work in the area of internationalist indoctrination of personnel being conducted in aviation units of the military districts as well as in the air forces of the groups of forces at joint tactical air exercises with aviation personnel of allied armed forces. Participants in the exercises demonstrate an improved level of air proficiency and professional skill and display excellent moral-political, comb. and psychological qualities as well as solid physical conditioning. They are filled with resolve through joint efforts to repulse any aggressor and to defend socialist achievements against any and all intrigues on the part of international imperialism.

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## COMBAT PILOTS MUST MASTER PRECISION FORMATION FLYING

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 4-5

[Article, published under the heading "Be Alert, In a Continuous State of Combat Readiness," by Military Pilot 1st Class Maj V. Belyayev: "From Precision Formation Flying to Combat Maneuvering"]

[Text] It was a sunny summer day. Flight operations were in full swing. Powerful jet engines roared on the ramp. Combat aircraft were taking off one after the other.

Capt A. Bludov's flight, having completed its training mission, landed. The pilots had been rehearsing air combat techniques in the practice area. Locked in fierce combat, each pair sought to gain the upper hand, to find that maneuver which would prove to be the right one in accomplishing the overall tactical mission.

Analyzing the flights in his debriefing, squadron commander Maj V. Grishanov noted the competent actions by the pilots at various stages of combat maneuvering and praised them for their will to win. He drew particular attention, however, to errors. The most serious error was the fact that during maneuvers at maximum thrust the flight had excessively opened up formation, offering the "aggressor" favorable conditions to attack the trailing aircraft pair.

Major Grishanov was well acquainted with Captain Bludov's difficulties. The majority of the pilots in his flight were young, whose development as combat pilots was just beginning. It was precisely for this reason that the squadron commander critiqued their performance in detail. Utilizing the flight recorder tapes, he analyzed the mock air engagement phase by phase. He drew schematic diagrams on the board, depicting the positions of the aircraft at different phases of maneuver, calculations of the most advantageous maneuvers, and group air combat tactical devices. The squadron commander directed attention toward rehearsing precision formation flying in non-stationary state conditions. On routine flights the pilots did a good job of holding position in formation. In an abruptly changing situation, however, they were imprecise in maintaining bearings, and therefore they were unable to maintain the specified formation.

By the end of the critique session the causes of the errors had become quite clear to everybody. The flight commander immediately formulated a plan to correct them. A particular place in this plan was occupied by individual work with the wingmen on observing safety procedures. This was connected with the fact that during formation flying vertical and horizontal spacings between aircraft should neither be unwarrantedly increased nor dangerously reduced. There are no and can be no trivial matters in rehearsing precision formation flying, especially when training recent service school graduates.

I recall that there was a time when we began to have more frequent occurrences of uncoordinated actions by pilots when taking off in pairs. It took a careful examination to determine the cause. It seems that the young pilots, when lining their aircraft up on the runway, failed to consider the fact that in hot weather the asphalt softens in the joints between the concrete slabs and, when the gear wheels contact them, after afterburners are lit there develops an appreciable turning moment. Unfortunately the commanders failed to explain this fact to the young pilots when teaching them takeoff procedures, which could have led to serious consequences. In other words, the cause of a potential aircraft accident situation was traced back to theoretical preparation of the young pilots.

...A pair of fighters stood poised at the end of the runway. As he awaited takeoff clearance, Lt V. Smirnov gazed through his cockpit canopy at the leader's aircraft. The mission was not an easy one: they would fly through the overcast and link up after breaking out. The young pilot was naturally somewhat nervous. In addition, the lieutenant had heard from one of his colleagues that when taking off in a pair, veteran wingmen switch on their afterburner when they see flame belching from the leader's exhaust. This thought was firmly imprinted in his mind. And for this reason the lieutenant had failed to heed the flight commander's reminder that the takeoff roll begins at the leader's command. He had decided to try a takeoff using a different method.

The tension grew. The command "Afterburner!" sounded in his headset, but Smirnov was taking his time. The lead fighter proceeded to tremble slightly, and afterburner flame shot from his exhaust. The leader's aircraft proceeded to roll. The wingman switched on his afterburner and released the brakes. His aircraft was lagging hopelessly behind, however. "I've got to catch up," the thought kept running through his mind. But they had reached the cloud bases.

"Break," the flight leader commanded.

Smirnov's fighter, executing the prescribed breakoff, continued climbing as it plunged into the milky overcast. His gaze was riveted to the instrument panel. Airspeed was a bit high, but the pilot decided not to throttle back. Emerging from the cloud cover, he quickly looked around. The flight leader was nowhere to be seen....

Failing to reestablish contact, they made their landing approach separately.

At the flight debriefing Lieutenant Smirnov competently described the procedure of linking up by an aircraft pair after breaking out of cloud cover. He was not at all anxious to admit his error. It was only after the interpreted flight-recorder data were presented, showing failure to adhere to prescribed flight procedures, that he admitted his mistake. A good deal of time has passed since then. The officer drew the proper conclusions and is currently in good standing in the regiment.

Time and again I have heard veteran pilots relate to young pilots their individual techniques of executing various maneuvers, procedures on takeoff and landing, and instrument flight. Of course exchange of experience and know-how is a good thing, but we should not forget that young people take in every word spoken by a respected combat pilot and trust him implicitly. Sometimes it takes only a slight boastful exaggeration or, what is even worse, poor advice -- and an unpleasant incident may occur, such as happened to Lieutenant Smirnov. Therefore when passing on know-how to younger military comrades, one must be very careful with each and every statement and recommendation.

Formation flight in the practice area, just as any other training mission, begins in the classroom, as they say. And its success depends in large measure on the quality of preparation. One can consider a precision pair that one in which the leader and wingman not only thoroughly understand each other but also sense what each other is about to do. But this is developed gradually, in the course of practice drills and training flights. The flight leader, especially during his wingman's period of training, must pay close attention to him, for many times it is not the wingman who is to blame for loss of the leader. Here is an example.

An aircraft pair was performing combat maneuvering. Completing a vertical maneuver, Lt G. Pchelintsev, as prescribed, commenced a tight 360 degree turn toward his leader. He was momentarily blinded by the sun. As soon as the aircraft had turned past the sun, the pilot proceeded to look for his leader, but was unable to spot him. He then reduced his rate of turn and shallowed his bank for safety's sake. The lieutenant began to feel uneasy, losing confidence in himself. He craned his neck, but could not see the leader. The flight commander, failing to hear the expected report "In position to your right," promptly discovered the error. The tower controller got the confused pair flying straight and level and helped them regain their bearings. But the flight, as they say, had "fallen apart"; the young pilot had lost confidence in himself.

The reason for the failure was later determined. The leader had failed to maintain the prescribed maneuver procedures and had maneuvered more sharply, as he had been accustomed to doing with an experienced wingman. Lieutenant Pchelintsev had been unable to follow his leader's moves and had fallen behind. The flight operations officer, Lt Col P. Krasnoyarov, made an entry in the log that flight leader Sr Lt N. Voronov had briefly firewalled his throttle, leaving his wingman with inadequate reserve thrust to maintain formation....

Formation flight and combat maneuvering demand of each and every pilot a heightened sense of his position in the formation, a high degree of piloting skill, composure and discipline. The slightest departure from the provisions of guideline documents and departure from prescribed procedures can create a near-mishap situation or lead to more serious consequences. In order to prevent them there must be smooth coordination between the flight operations officer, tactical control officers, and airborne aircrews.

A meeting of the methods council was held to study the causes of the errors and to devise preventive measures. The council members thoroughly analyzed methods of teaching formation flying both as pairs and flights. Wingmen, during execution of steep 360 degree turns and vertical maneuvers, were authorized independently to change position in the formation, reporting that fact to the leader. In order not to clutter the air with superfluous conversation, specific radio communications procedures were spelled out. The methods council also recommended synthesis of the know-how of the top flight commander, Military Pilot 1st Class V. Badayev, who devotes the most serious attention at each training session during the period of general training to forming in his men the moral-combat and psychological qualities essential to the combat pilot. He considers the main condition for successful performance to be a close unity of thorough ideological conviction by the pilot and a high level of pilot expertise. Therefore he seeks more fully to reveal the weapon, tactical and maneuver capabilities of the aircraft system, inspires in his men confidence in the aircraft's dependability and malfunction-free reliability, and graphically demonstrates this in the air.

During practice sessions on the simulator and in the cockpit, Captain Badayev works persistently to develop in his pilots complete automatism in operating the cockpit controls. He frequently repeats: "If during combat a pilot's attention is occupied by the cockpit equipment rather than the adversary's position in space, rather than with the endeavor to outguess the adversary and beat him to the punch in firing his weapons, an engagement can be considered lost. Therefore one's eyes should be watching the adversary, while one's hands are doing everything by themselves." Of course fundamental skills in precision formation flying are acquired on formation flying check rides. The finest instructor qualities of the flight commander are revealed precisely in this situation. He not only notices the slightest errors by each individual but also helps correct them in a methodologically competent and knowledgeable manner, seeking to ensure that the wingman instantly understands the leader's signals and skillfully utilizes the PKI [expansion unknown] network.

Aviators frequently use the term "conscious automatism." Time and again I have even heard debates about its legitimacy. Here is one of the arguments. Automatism eliminates thinking about what operation should be performed at a in such situations is out of the question. This makes sense, but I see awareness in something else. In my opinion it would be more correct if awareness by each and every pilot were a firm necessity while still on the ground, during practice sessions, honing one's actions to complete automatism. This kind of automatism can be called conscious. It is vitally essential during group combat maneuvering, especially in the vertical plane, when visual contact between aircrews is sometimes lost during certain segments of the flight trajectory. It also sometimes happens that a flight must split up into

pairs and subsequently come back together in the course of maneuvering, according to the general plan of engagement. And of course absolute precision of execution cannot be achieved without thorough rehearsal of these actions on the ground and on check rides.

Well aware of this fact, Captain Badayev does not ignore a single item which arises during training activities. In preparing for air engagements the flight leader always allocates time for "walking it through," in the process of which the following items are refined and detailed: when, where, and how the initial position for the attack should be taken, and what tactic should be given preference in a given situation. Thus each combat pilot gradually forms his own arsenal of tactical devices and develops the ability swiftly to execute them and to shift from one to the other.

Low-level formation flying always involves such factors as proximity of the ground, maneuver restriction, and little time available. Even in a calm situation formation flight produces considerable stress and demands excellent proficiency, composure, discipline, and reaction speed. But what if the situation suddenly changes abruptly?

...Once Sr Lt M. Zolotarev was flying in a pair. As they were heading their fighters toward the target, the pilots were instructed by the command post to change to another communications frequency and at the same time to adjust heading. Switching his radio to the required frequency, Zolotarev shifted his gaze into the cockpit, and naturally for several seconds was not watching his leader. During this time the spacing between the aircraft increased. It took additional seconds to regain formation, and the attack failed due to the high speed of closing on the target. The reason for the pilot's failure lay in his inadequate degree of skill in manipulating cockpit equipment.

The modern fighter's aiming-navigation systems and weapons give pilots the capability to accomplish the most difficult missions. Persistent daily training, practice sessions on the ground, and beneficial utilization of each and every minute of flying time, however, are essential in order to master these systems. At the same time, the specific features of modern multiple-aircraft air combat dictate the necessity of mastering all types of air combat throughout the entire range of speeds and altitudes. The road to mastery of combat maneuvering lies through a good mastery of precision formation flying.

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## SOCIALIST WAY OF LIFE PRAISED AS SUPERIOR TO CAPITALISM

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 6-7

[Article, published under the heading "26th CPSU Congress: Problems of Theory and Practice," by Candidate of Historical Sciences Lt Col Ya. Ren'kas: "Great Achievement of Socialism"]

[Text] The Soviet people, under the guidance of the Leninist Party, have trod a great and glorious road, and have carried out profound socioeconomic reforms. One of their greatest achievements is the Soviet, socialist way of life. An atmosphere of genuine collectivism and comradeship, cohesiveness, a friendship among all this country's nationalities and ethnic groups, growing stronger day by day, moral health, which makes us strong and steadfast -- these are bright facets of the Soviet way of life.

The finest traits and qualities of our great people, instilled every day and every hour by the socialist way of life, characterize Soviet military aviation personnel, just as they characterize other armed defenders of the homeland. The tasks of the present stage in the development and improvement of the Soviet society and the socialist way of life were comprehensively examined by the 26th CPSU Congress and subsequent CPSU Central Committee plenums.

The problems of way of life have always concerned mankind. But they have become particularly acute in our time. This is due to a number of circumstances. First of all, the Soviet, socialist way of life has become a reality, arousing profound interest on the part of the toilers of the entire world. Secondly, bourgeois propaganda, distorting the truth about it, seeks to impede growth in the prestige of socialism. And thirdly, problems of way of life are fundamentally differently formulated theoretically and practically resolved in conditions of socialism and capitalism.

Just what is the socialist way of life? Is this a new social phenomenon?

Marxist-Leninist science views way of life as an aggregate of the forms of vital activity of society, peoples, classes, social groups and individuals, taking form in conditions of a specific socioeconomic system, on the basis of the mode of material production inherent in that system. The forms of people's vital activity and interrelationships are diversified. They encompass both material production and spiritual-intellectual life. Of determining significance thereby is the mode of production of material goods.

In the capitalist society, which is based on private ownership and man's exploitation by man, all social institutions form a way of life which corresponds to the status and interests of the dominant bourgeois class. The life principle of the bourgeoisie, as V. I. Lenin defines it, is as follows: either you rob others or others rob you, either you work for another or he works for you, either you are a slaveholder or a slave.

Exploiting the people, the imperialists doom hundreds of millions of persons to hunger, poverty, and sickness. On a global scale, half a billion persons suffer from chronic hunger. Even in the United States, this most powerful capitalist country, 80 million persons, that is, approximately one out of every three Americans, according to Labor Department estimates, are living on an income which is below an adequate level; 35 million persons living "below the poverty level" suffer from hunger; more than 27,000 Americans, driven to desperation, commit suicide each year. Last year there were a total of 34 million unemployed in the nations of the West. Deep antagonism and an uncompromising conflict between labor and capital are expressed in steady growth of the army of "superfluous persons." The standard of living of the toilers has sharply worsened. For many years now galloping inflation has been eating away at their earnings; today real income, in the United States, for example, is approximately 15% lower than in 1973.

Standing in contrast to the capitalist is the socialist way of life, which was first established in our country. Its emergence is due to the historical role of the proletariat as the principal creator of material and spiritual goods, liberator of all the toilers from exploitation and oppression, and an internationalist class. Born with the victory of the proletarian revolution and developing in the course of building a new society, the socialist way of life has its own foundations, dictated by the nature and essence of socialism.

Its socioeconomic foundation is comprised of ownership of the means of production by all the people, socialist production relations, an orderly, dynamically and steadily developing economy; its political foundation consists of an alliance between the worker class, peasantry, and intelligentsia, an international brotherhood of peoples, and a government of all the people. It is a system of broad representation of the masses in legislative and executive agencies of authority, mass public organizations, and a true democracy. The spiritual and intellectual foundation of the socialist way of life is the prevailing Marxist-Leninist ideology, Communist ethics and morality, and a progressive culture. The Soviet way of life has become established on this solid foundation, under the guidance of the Communist Party.

What are its characteristic features? First of all, our society is characterized by sociopolitical unity. Under capitalism the pursuit of profit

at any cost is a firm law and mutually alienates and disunites people, while socialism affirms the collectivist nature of the vital activities of the members of society. While under capitalism people are forced to live in an atmosphere of ideological-political crisis and raging nationalism, chauvinism, and racism, the socialist way of life is characterized by genuinely humane relations and mutual respect between individuals, a unanimous rallying together of all nationalities and ethnic groups.

The ideological-political unity of our society and the indissolubility of interests of the individual and society, of all classes and social groups, which characterize our way of life, find vivid and comprehensive expression in socialist democracy, democracy of a new and higher type. The source of its great advantages lies in the fact that for the first time in history the toilers are in power and govern all the affairs of society. The elections to the USSR Supreme Soviet, 11th Convocation, in March of this year constitute vivid evidence of this. A total of 184,006,373 persons, or 99.99% of the total number of eligible voters on the rolls, took part in the election. As in the past, more than half of the deputies are members of the worker class and kolkhoz peasantry. Approximately 33% of the deputies are female. Not one bourgeois parliament and not one capitalist country can claim such broad popular representation.

The genuinely democratic spirit of our system is embodied in the Soviets -- the most representative agencies of authority, in the trade union, Komsomol, cooperative, and other public organizations, and in workforces, which constitute an effective and mass school of indoctrination of civic maturity and a feeling of direct involvement in all the affairs of society. This was forcefully reemphasized at the April (1984) CPSU Central Committee Plenum, where it was noted that we shall continue in the future to utilize reserve potential for activating the masses, potential which is to be found in further improving socialist democracy and the entire political system of society, and first and foremost in improving the activities of the soviets -- the political foundations of the USSR and a powerful instrument for building socialism.

The picture is different in the world of capital. Elections there are increasingly being turned into a unique competition: he who spends more money receives more votes. "Capital investment" of this kind ensures the election of "the right" people to the legislature. They in turn implement policies advantageous to the bourgeoisie, ensure that the major companies are awarded big contracts, and give them various preferential conditions. Japan's Liberal Democratic Party, for example, which represents the interests of the upper strata of the bourgeoisie, once received 515 billion yen from big capital for parliamentary elections. At last December's elections this party estimated campaign expenditures at 10,000 yen per vote.

Also indicative is the following fact: 71% of the members of the British Cabinet formed following the 1979 elections were directors of companies, 14% were large landowners, and 86% were graduates of elite private schools at which only members of the propertied class can afford to educate their sons.

This is the other side of the bourgeois democracy.

An important feature of the socialist way of life is labor free of exploitation, directed toward implementation of Communist ideals. In the process such social qualities of Soviet citizens and models of conduct are formed as collectivism, cooperation, mutual assistance, etc. And although labor under socialism remains for the time being a means of subsistence, Soviet man increasingly seeks in labor not only earnings to meet his material needs but also satisfaction in the very process of activity. And this means that the need for labor has now taken a firm place in his life. In addition, the concept of labor adopted in the Soviet Union possesses socialist content, grounded on the fact that the right to labor is inseparably linked to the obligation to work, and this combination serves as the basis of social equality of Soviet citizens.

The successes of the USSR in all branches and sectors of the economy attest to our people's great labor vigor. In the last five years the Soviet economy -- the foundation of our homeland's might -- has risen to a higher level. National income has grown 18.6%, with more than four fifths of this growth from increased labor productivity. Fixed productive assets have grown by 39%. More than 1,000 new state industrial enterprises have come on-stream. The Urengoy-Pomary-Uzhgorod natural gas pipeline, the world's largest, was completed ahead of schedule. The natural resources of Siberia and the Far East are being successfully developed and exploited, and the Baykal-Amur Mainline is coming on-line. The Energy Program is being sequentially implemented. Our country is the world leader in the production of more than 30 major categories of industrial products, including oil, steel and rolled products, tractors, diesel and electric locomotives, cement, mineral fertilizers, and woolen textiles.

A great deal is being done to improve the agrarian sector of the socialist economy. It was noted at the All-Union Economic Conference on Problems of the Agroindustrial Complex that all our people have become involved in implementing the Food Program. Gross agricultural output in 1983 rose by 5% over 1982, totaling almost 134 billion rubles. The economy of our kolkhozes and sovkhozes is growing stronger, and rural housing, cultural and living conditions are improving.

A characteristic sign of our times is the high living standard of our country's toilers and a constant rise in their material prosperity. An extensive network of nursery schools and kindergartens, the world's cheapest rents, free education at schools of all levels, medical care, use of libraries, clubs, and athletic facilities -- all this has become natural and customary in the life of Soviet citizens.

The extensive program of further improvement in living standards specified at the 26th CPSU Congress encompasses the most diversified aspects of life. The party deems it particularly important to provide the public with the requisite goods, to broaden the available variety and improve the quality of goods. A comprehensive growth and development program for manufacture of consumer goods and services is being drawn up. Medical care is improving, and preparations have begun for adoption of an annual medical examination for every citizen. The party attaches great importance in solving social problems to absolute accomplishment of targets pertaining to construction of housing,

schools and preschool facilities, hospitals and other cultural-services facilities. Last year, for example, approximately 10 million persons improved their housing conditions. A broad aggregate of measures is being implemented in the area of environmental protection and rational utilization of natural resources.

Our party and government, expressing the aspirations of the Soviet people, are doing everything possible to preserve and strengthen world peace. Today the international situation has greatly worsened, however, through the fault of ultrareactionary imperialist forces, which seek to impede social advance. The United States and its NATO allies are engaged in an undisguised attempt to shift in their own favor the military balance in Europe and worldwide.

In his speech at the special February (1984) CPSU Central Committee Plenum, CPSU Central Committee General Secretary Comrade K. U. Chernenko gave a profound and comprehensive appraisal of the causes of aggravation of the international situation, reaffirmed the party's consistent course of foreign policy, and expressed the unified will of the Soviet people for peace and their determination firmly to repulse the "crusade" against socialism announced by Washington. Response measures taken by the USSR and its Warsaw Pact allies has won the unanimous approval of the Soviet people, the toilers of the other nations of the socialist community, and has been met with understanding and support by all men of good will in foreign countries.

The USSR Armed Forces stand guard over the peace and security of the Soviet people. They are characterized in full measure by the fundamental traits of the Soviet, socialist way of life, since our army is an integral part of the Soviet people. The truly popular nature of the USSR Armed Forces is manifested in the fact that manpower acquisition is carried out pursuant to the Law on Universal Military Service Obligation, on the basis of which Soviet citizens are inducted into military service regardless of their racial and ethnic affiliation, religious beliefs, level of education and financial means.

The nature of the socialist system and the moral-political unity of the people are fully reflected and manifested in the USSR Armed Forces. Friendship and comradeship have taken on the features of genuine military brotherhood and have been transformed into an enormous educational force. "The finest from the group to each individual, the finest from each individual to the group" is one of the leading principles of life in the military, a vivid manifestation of the socialist way of life.

For example, the activities of Air Forces units and subunits and their accomplishment of the difficult and important tasks assigned by the 26th CPSU Congress and subsequent CPSU Central Committee plenums are inconceivable without the enormous mobilizing role of the party organizations and without the active work of Komsomol and cultural-educational establishments.

The social maturity of the military collective is characterized by active mutual assistance and comradely cooperation. This is expressed in full measure in socialist competition in Air Forces units and subunits. It is a powerful means of mobilization of military aviation personnel for accomplishing tasks of further increasing troop combat readiness and plays an

enormous role in forming in personnel excellent moral-fighting qualities and an aggressive experiential posture.

The structural edifice of military service is in turn exerting a beneficent influence on the way of life of society as a whole. Service in the military, it was emphasized at the 26th CPSU Congress, helps form excellent moral-political qualities in young people and constitutes a school of maturation.

The socialist way of life is an outstanding achievement of mankind. It is increasingly more fully and graphically demonstrating the advantages of genuine socialism over the world of capital. Different criteria are penetrating the consciousness of millions of people throughout the world, with the aid of which they are objectively comparing the two world systems. The scale is inexorably tipping in favor of socialism.

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## BENEFICIAL DISSEMINATION OF TRAINING KNOW-HOW AT PILOT SCHOOLS URGED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 8-9

[Article, published under the heading "A Higher Level of Effectiveness of Party Influence at Air Forces Higher Educational Institutions," by Maj Gen Avn I. Voloshko, military council member, chief of air forces political department, Red-Banner Kiev Military District: "Utilizing Experience in an Efficient Manner"]

[Text] Summer combat training is in full swing. Our district's military aviation personnel, competing under the slogan "Be alert, constantly prepared to defend the achievements of socialism!", are doing their part to raise even higher the level of vigilance and combat readiness, to improve the proficiency of instructor pilots, and to strengthen the student pilot's flying skills. Advanced know-how serves as a reliable accelerating agent in combat training. We Communists are focused toward its efficient synthesis and adoption by the proceedings and decisions of the 26th CPSU Congress, subsequent CPSU Central Committee plenums, the demands of the USSR minister of defense and commander in chief of the Air Forces.

Synthesis and dissemination of advanced know-how constitute one of the main directional thrusts for improving the quality and effectiveness of the teaching and indoctrination process and party-political work at Air Forces higher educational institutions, it was noted in an article by Col Gen Avn L. Batekhin, military council member and chief of the Air Forces Political Directorate (AVIATSIYA I KOSMONAVTIKA, No 3, 1984). Indeed, the experience and know-how of the top performers concentrates models of excellent professional and pedagogic expertise, efficient work methods and techniques of political workers, faculty members, instructor pilots and leading cadets. Advanced know-how is our main reserve, by utilizing which we can stride forward with confidence, achieving more in improving the work of military aviation schools.

If we analyze activities in this area by administration, political sections, party and Komsomol organizations of our aviation schools, we can draw the following conclusion: recently there have occurred definite changes for the better in approach to analysis, synthesis, and adoption of advanced know-how. This has been promoted by thoughtful study and implementation of the demands

of the April (1984) CPSU Central Committee Plenum and the basic directional thrusts of the reform of the general-curriculum and vocational school, including higher educational institutions. In the process of combat and political training, at teaching methods meetings, seminars, professional conferences, post-mission critiques and debriefings, party and Komsomol meetings, greater attention has begun to be devoted to synthesis of that which is truly worthy of adoption and dissemination. Following the Leninist behest to study from the proficient, meaningful study of the work style and methods of top performers is given the attention focus.

The district military council, political department, and air forces headquarters staff are supporting and further developing this work, concerned with ensuring that advanced know-how is being adopted in a practical manner. We devote special attention to study of the state of affairs in those military collectives which have achieved positive results in accomplishing tasks pertaining to further increasing combat readiness, improving quality and effectiveness of training, and strengthening discipline. We endeavor to give an objective appraisal to all valuable and positive things which are enriching the training and indoctrination process as well as party-political work.

For example, district air forces political department officers studied and analyzed the work experience of the training aviation regiment in which officer S. Kosygin serves. His aviators have achieved high, stable results in combat and political training. The members of the district air forces military council recommended adoption of their fruitful work techniques in other training units. For example, securing of effectiveness of direct preparation of pilot cadets for training flights, comprehensive resolution of matters pertaining to flight, moral-political and psychological training, and intensification of training sessions on aircraft by creating a situation maximally approaching actual combat. As we know, a large organizing and mobilizing role in achieving success is played by socialist competition on assigned tasks and performance standards.

Such a work form as meetings of command-political personnel directly in vanguard units and schools, where participants have the opportunity to learn first-hand from the possessors of advanced know-how about efficient labor methods, has also proven quite effective.

One can hardly overemphasize the role of party committees in study, synthesis and adoption of advanced know-how; party committees impose greater demandingness on Communists for organization of class sessions and for high-quality execution of training schedules and programs. Special attention is focused on practical adoption of all new and positive elements. This requires thorough knowledge, a high degree of military technical training, and thoughtful daily labor. The members of the party committee of the training regiment at the Order of the Red Star Kharkov Higher Military Aviation School for Pilots imeni Twice Hero of the Soviet Union S. I. Gritsevets determine, on the basis of analysis of combat training and progress in aviation personnel socialist competition, the precise "address" of advanced know-how, designate specific measures in their schedules, and seek to ensure their absolute implementation.

For example, pilot cadets M. Matyushenko, V. Kovalev, and P. Kostyrin, from the training aviation flight under the command of Maj A. Khimich, flew fewer dual training flights than the others in mastering the advanced flying skills program, and they were the first in the collective to do formation flying without an instructor. The party committee suggested that the work experience of the flight commander be synthesized. The unit commander approved this suggestion. At the advice of party committee secretary Maj N. Vlasenko, the members of the squadron party buro thoroughly acquainted themselves with the work performance of the socialist competition winners. They took note of the fact that in Maj A. Khimich's flight special significance is attached to such an important form of student training as flight critiquing. Prior to each performance evaluation, utilizing flight recorder data, the flight commander specifies all pluses and minuses in the performance of his men and analyzes them in detail. A large diagram is utilized in this flight for graphic presentation and comparability of performance results; the diagram depicts pledges of competing personnel stage by stage. It is prepared for training flights in conformity with the schedule.

Party activists also drew attention to the fact that the flight commander carefully studies the training progress of the young aviators. In so doing he essentially is becoming a genuine scholarly investigator. Comparison and thorough analysis of errors enables him to determine the proper way to go in order to improve the proficiency of his men.

It once happened that some pilot cadets, who had been making successful progress in training, began making mistakes on landing -- the most critical and complex flight phase. The student pilots and their instructor were aware of these mistakes and tried to correct them, but they kept repeating. Maj A. Khimich came to their assistance. Conducting post-flight critiques in the flight, talking with the men and examining the flight recorder tapes, the flight commander determined that at one phase of the approach the student pilots were too low on the glidepath. He communicated his conclusions to the squadron commander. Together they drew up a flight simulator practice schedule. The student pilots thoroughly practiced final approach on the glidepath, learned to hit the point of flare initiation with precision, and subsequently no longer made such errors.

There are various ways of synthesizing experience and know-how. In this instance the party activists decided that it would be more useful if Major Khimich himself discussed flight critiquing methodology. Soon thereafter, when summarizing flight operations shift performance results, the commander of this vanguard flight shared his observations with his comrades and discussed the most effective training techniques. His presentation was specific and instructive and produced clear benefit. The other flight commanders adopted many of officer Khimich's techniques. Party activists publicized the dual instruction program experience in this flight in the wall press and over local radio, which also had a positive effect.

Publicizing the experience and know-how of vanguard aviation personnel, the members of the party committee headed by officer N. Vlasenko utilize various work forms and methods. First and foremost, they arrange for oral presentations by the authors proper of advanced know-how -- the best

commanders, instructor pilots, and highly-skilled aviation engineer service specialists. In particular, Lt Col V. Shekhovtsov, addressing young instructor pilots, related in detail how he utilizes flight recorder tapes to determine student pilot readiness to solo. Also edifying was a presentation by Lt Col V. Landyshevskiy, who shared his know-how in organizing socialist competition by targets and performance standards.

Technical conferences are a valuable means of dissemination of advanced know-how. Exchange of views and acquaintance with the achievements of vanguard performers illuminate important facets of achieved success, help one find unutilized reserve potential, and impel aviation personnel to act vigorously and apply the experience and know-how of the leading performers in their practical activities. The party committee members devote serious attention to a continuously-operating "Forum of Advanced Know-How" and "Komsomol Searchlight."

On the whole the example of vanguard performers shows that purposeful activity by the political agency, substantive and effective party-political work, closely linked with accomplishing combat training tasks, foster extensive adoption of advanced know-how into practical training and indoctrination of young aviation personnel. And the collective is justly proud of the results. Flight training schedules are being carried out in the unit with excellent quality. Pilot cadets are graduating with an average grade of 4.6.

We also have other collectives in which considerable importance is attached to synthesis and dissemination of advanced know-how. For example, a great many valuable and instructive things can be learned at the Chernigov Higher Military Aviation School for Pilots imeni Lenin Komsomol. At this school, alongside discussions and political briefings, publication of information bulletins, news sheets, and radio newspapers, lecture series, specific-topic evening events, and scientific methods seminars have come into widespread use. Such work is being done both within the subunits and in the school's flight training section. A series of lectures on the topic "History, Contemporary Status of and Future Prospects for Aircraft" was organized by Col I. Yagunov, for example, at the recommendation of the political section. They considerably heightened the pilot cadets' interest in technical subjects and helped enlist them into military-scientific activity.

For quite some time now one of the school's departments has been maintaining a log in which typical potential air-mishap situations are described and recorded. Cards prepared on the basis of this log are extensively utilized in class. They make it possible, with specific examples from daily activities, better to understand flight personnel errors and to appraise competent actions by aviation personnel in emergency situations during flight.

A scientific methods seminar is operating successfully at the school, devoted to studying the latest advances in aviation science and technology and improving teaching and indoctrination methods. The seminar materials have been synthesized in a collected methods volume and are used by all instructors in teaching and scientific activities.

Activities include specific-topic evening events and film festivals dealing with the heroic feat of the Soviet people in the Great Patriotic War, as well as get-togethers with veterans, combat pilots, and aviation personnel who have performed their internationalist duty as members of the limited contingent of Soviet forces in the Democratic Republic of Afghanistan. All this helps form in future pilots excellent moral and combat qualities and instills love of their heroic profession and dedication to the socialist homeland.

We still have unutilized reserve potential, however. Not everywhere is there an ability to utilize valuable experience and know-how correctly and efficiently. Unfortunately in certain collectives they still sometimes at best list the names of vanguard aviators, but are unable to say much about their experience and know-how. Sometimes even the published news sheets are akin to a copied manual of procedures for a given specialist. According to external appearance, everything would seem to be fine. But if one takes a closer look, it turns out that operational news sheets, wall newspapers, posters, everything which should be publicizing advanced know-how, is dull, toneless, and consequently unnoticed. Occasionally they will post a photograph of a vanguard performer with a brief caption under it indicating last name, first name, patronymic, proficiency rating, position held, and call this dissemination of advanced know-how. This is why commanders, political workers, party and Komsomol activists have the task of keeping a close eye on this area of work activity and of making visual agitation a potent weapon which impels personnel to catch up with the vanguard performers.

Advanced know-how in utilizing flight simulators requires more detailed study, and the campaign for thrift and economy requires thorough dissemination.

Commanders, political workers, and party organizations constantly concern themselves with developing ingenuity, composure, boldness, and courage in pilot cadets. Excellent moral-political, combat and psychological qualities are developed in future pilots from their day of arrival at school. Moral-political and psychological training sections have been set up in the departments. Their operation experience requires more thorough analysis and extensive, practical dissemination.

There is no question that dissemination and practical adoption of advanced know-how is a necessary thing, requiring persistence, purposefulness, and good organization. The political section endeavors to communicate all valuable and instructive information to commanders, political workers, party and Komsomol activists at training conferences, seminars and meetings with activists. Study and discussion in party and Komsomol organizations and military collectives of the proceedings of the special February (1984) CPSU Central Committee Plenum also has a beneficial effect on our work in the area of synthesis and adoption of advanced know-how. CPSU Central Committee General Secretary Comrade K. U. Chernenko emphasized in his address at the plenum: "The ability to see in a timely manner and support popular initiative, and in the broadest meaning of the term -- from a good-management, innovative attitude toward the job at one's work station to active participation in running government and society -- herein lies a very great, one might say inexhaustible reserve potential for our further advance."

These words, and the very spirit of Comrade K. U. Chernenko's speech prompt Communists and all military personnel, adopting advanced know-how in a practical manner, to seek unutilized capabilities and reserve potential to improve the quality and effectiveness of all work, to achieve further intensification of the training process and socialist competition.

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PRESENT U.S. GOVERNMENT EQUATED WITH NAZI GERMANY

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 10-11

[Article, published under the heading "Imperialism -- Enemy of Peoples," by Col P. Golovin: "Brown Shadow of the Past"]

[Text] "Reactionary imperialist circles cannot accept the fact of the main trend in contemporary world development. They realize that the wheel of history in its natural movement is advancing socialism and universal affirmation of the principles of national freedom and social justice."

From address by CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, at the Armed Forces Conference of Komsomol Organization Secretaries

...High-voltage electrified barbed wire girdling the compound of Hitlerite concentration camps, guard towers, SS troopers with heavy-caliber machineguns, prepared to open fire at all times, and guards with savage German shepherds specially trained to tear prisoners to pieces. Stacks of bodies: these include prisoners who were hanged and shot, asphyxiated in gas chambers and who died from illnesses. People are standing by long huts, appearing as shadows, exhausted by torture and hunger, with deathly despair in their eyes....

These scenes are from a documentary film on the horrors of the fascist death factories made by British director Alfred Hitchcock at the end of the last war. This film, however, was not fated to be released at an early date. In 1945, by order of the British authorities, this film document, which is an indictment of fascism, suddenly "disappeared," and it was not until almost 40 years later that it was discovered by chance. The reasons are obvious. The total and unconditional destruction of fascism -- a criminal detachment of world reaction which was unprecedented in its anticommunist directional thrust -- did not have a place in the adventurist calculations of U.S. and British political leaders. Hence attempts by imperialist propaganda to whitewash fascism at all costs, to erase from the memory of peoples the enormous

casualties and sufferings, the sea of human blood shed through the fault of fascism.

Here are just a few facts. More than 50 million persons lost their lives in World War II, which was unleashed by Hitlerite Germany. 35 million persons were wounded or injured, more than 20 million of whom remained permanently disabled. More than 10 million persons died of starvation and epidemics caused by the war. And 18 million Europeans passed through the fascist death camps. The fascists murdered approximately 12 million prisoners from 30 different countries in these camps and ghettos. Suffice it to say that during the years of fascist occupation in the various nations of Europe, the butchers not only herded entire families to the executioner's block but wiped out the entire population of certain cities, towns and villages. The tragedies of Khatyn in Belorussia, Obukhovka in the Ukraine, Lidice in Czechoslovakia, Oradour-sur-Glane in France, and Guernica in Spain will remain forever in the memory of mankind.

The fascists treated Soviet citizens on temporarily occupied territory with particular barbarity. Among the many sinister plans of the Hitlerite occupation forces, we should mention in particular master plan "Ost," which openly expressed their aspiration to enslave and annihilate entire peoples. According to this plan the territories of Latvia, Lithuania, Estonia, the Ukraine, Belorussia, and the European part of the RSFSR were to be settled with Germans and subsequently incorporated into Germany. The fascists intended to utilize as slaves only a very small part of the population of these territories; the remainder were to be killed or expelled beyond the Urals. A special team of professional murderers, headed by Gestapo and SS butchers, was formed and trained.

The fascists brutally tortured many hundreds of thousands of Soviet citizens in the death camps of Auschwitz, Dachau, Majdanek, Sachsenhausen, Buchenwald, and elsewhere. More than 4 million Soviet citizens were hustled off to Hitlerite Germany as slave labor. The war claimed the lives of more than 20 million Soviet citizens. Our country also suffered incalculable material loss. The occupation forces burned and demolished 1,710 cities and towns, 70,000 villages, and 32,000 industrial enterprises. Our country lost 30% of its national wealth.

At the present time bourgeois ideologists are attempting to relegate to oblivion the grief, tears and sufferings of millions of persons who experienced the horrors of fascism. Distorting the events of the past war, they pursue a single aim: to rehabilitate in the eyes of the world community the reactionary essence of imperialism and to justify its present aggressive policy and preparations for another world war against the Soviet Union and the other socialist countries.

At the same time brown-shirted thugs are marching through the streets of many Western cities, carrying a portrait of Hitler and shouting fascist slogans. They are cold-bloodedly murdering persons of a different skin color. Various neofascist organizations and their storm troops, which are active in almost 60 countries, are acting in precisely this fashion.

Neo-Nazism.... Articles about it are currently appearing regularly on the pages of the West European press. Propaganda of fascist ideas in various forms by extreme reactionary circles is continuing throughout the capitalist world. Hence increased activeness on the part of neo-Nazi groups and militarist organizations. In the FRG, for example, together with 300 militarist alliances and associations of fellow countrymen, which total hundreds of thousands of members, they are openly preaching the cult of Hitler and the ideas of violence and revanchism. According to official figures, which are patently understated, so-called "registered" neo-Nazis alone total more than 20,000 in the FRG. While formerly the National Democratic Party (NDP) was the nucleus of the neo-Nazi movement, today, reports the newspaper DEUTSCHE NATIONALZEITUNG, the "German Popular Alliance," the membership of which has recently doubled, is laying claim to the role of leader.

In many West German cities "reunions of war veterans" are regularly held under revanchist slogans. Many members of the Bundeswehr, whose example people are being called upon to follow today in the FRG, are known not only for their war crimes but also for their vigorous anticommunist activities in the postwar period.

H. Rudel, a former fascist colonel in Hitler's Luftwaffe and passionate supporter of remilitarization of West Germany, to his dying day advocated "preparation of Europe for a crusade against the Red East." It was reported in the West German press that more than 2,000 "old and new Nazis" attended Rudel's funeral, held in the small village of Dornhausen. They clearly demonstrated their recognition of the deceased as a "hero of the past war," who was in particular favor with Hitler and who "distinguished himself" on the Soviet-German front. At the time the newspaper DEUTSCHE NATIONALZEITUNG devoted six columns to Rudel, calling him a "national hero of the German people." The newspaper reported with relish the "combat deeds" of this fascist vulture and cited incredible figures purporting to be on Soviet military equipment he had destroyed. There was not a single word in the article, however, about the fact that Rudel had bombed Soviet ambulance trains and passenger vessels, or that in 1941 he had bombed trains carrying Soviet civilians being evacuated eastward.

Also evoking outrage is the fact that a medal bearing Rudel's likeness and the inscription: "Eagle of the Eastern Front, Commander of the Immelman Squadron" was commissioned by reactionary circles in the FRG. It joined the arsenal of similar medals struck in the past in honor of Hitlerite war criminals Hess and Doenitz, Rommel and Guderian, Skorzeny and others, as well as medals "For Valor in the World Wars," "Prisoners of War," "Heimatvertriebene" [persons expelled from the Eastern Territories] and other medals. Their purpose is not only to glorify the Wehrmacht and its soldiers but also further to whip up a spirit of revanchism in Germany and to accomplish even more vigorous spread of the pernicious criminal ideas of neo-Nazism among the younger generation in the FRG.

That country is being increasingly inundated by a murky flow of neofascist literature. There are presently in circulation in West Germany at least 50 million books, pamphlets and other published items of purely neo-Nazi thrust. The man in the street is offered biographies of Hitler and other fascist

butchers, diaries and memoirs of Wehrmacht generals, records of speeches by Goebbels, while antiquarian shops are doing a brisk trade in "Third Reich" medals and decorations.

There is a truly blasphemous collection of portraits of Hitlerite Aces on the pages of a collection of documents and photographs recently published in the FRG, titled "Adler" [Eagle]. The volume deals with German-fascist air operations in World War II. Fascist pilots are smiling as they gaze out of a bomber cockpit at their handiwork. Below them lies bomb-cratered Soviet land.

It is a well-known fact that neofascist parties and groups exist legally in the FRG and that war criminals guilty of the deaths of hundreds of thousands of persons remain unpunished. West German television runs Goebbels newsreels which laud the crimes of the Nazis during the war years. It is evidently to somebody's advantage for the swastika to capture the minds of West Germany's youth.

Neofascist rallies have recently taken place in a number of large West German cities, which were accompanied by acts of arson against the premises of progressive organizations, beatings of citizens by goon squads, and violent actions directed against participants in peaceful demonstrations against turning the territory of the FRG into a launching pad for new U.S. death-dealing weapons.

The progressive segment of the public is also concerned by the fact that the leaders of neofascist organizations are placing emphasis on recruiting as many young people as possible and are seeking to strike deep roots into the armed forces of the FRG.

Activation of latter-day Hitlerites is also fostered by a recent government decision to legalize the activities of the association of former members of the SS (KhIAG).

All this attests to the fact that preserving ties with the Nazi past and the atmosphere of war psychosis being whipped up with the aid of rightist elements make it easier for leading circles in the FRG to implement militarist schemes.

Communist parties and other progressive antimonopolist forces in the capitalist countries are alarmed by the recently stepped-up activities of neofascist organizations not only in the FRG but also in Italy, Great Britain, France, Australia, the United States, and Latin American countries.

Aligning itself increasingly more closely with the ultrareactionary forces of imperialism, which are waging a struggle against socialism, peace and progress is international Zionism, which is aggressively utilized by the most reactionary circles of imperialism as one of the shock detachments of the "crusade" against communism announced by Reagan.

The center of militarist passion has presently shifted to the United States. This is graphically manifested in the actions of the present U.S. Administration. Militarist propaganda is being sharply stepped up in that country, and the scale of ultraconservative, profascist ideology is growing.

The influence of persons of extreme rightwing convictions is growing in the legislative and executive branches. The American Themis has taken more than one fascist hanger-on under its wing. According to figures in the U.S. press, for example, approximately 5,000 Hitlerite war criminals are presently residing in the United States, hiding from vengeance. And yet legal proceedings were initiated only in the cases of 600 of these persons, and more than half of these were soon dropped.

The Washington brand of anticommunism is greeted with delight by the neofascist parties. It is not mere happenstance that many Nazi criminals still hold high positions in the CIA, organizing terrorist actions and carrying out subversive activities against the socialist countries and progressive forces. This is why such ultraradical profascist organizations as the John Birch Society, the Minutemen, the Ku Klux Klan, the National White Citizens Council, the Christian Anticommunist Crusade, the American National Socialist Party, and others feel right at home in the United States. The unbridled theorists of American fascism cynically declare that they are the direct successors of Hitler. They back up these words with specific deeds. The brutal slaughter of civilians in the Vietnamese village of Song Mi and other barbarous acts by the U.S. military in Vietnam are fresh in the memory of mankind.

There are in the United States more than 2,600 mass ultra-rightwing organizations, with a total membership running into the hundreds of thousands. Their misanthropic ideas are disseminated by more than 600 radio stations, thousands of radio and TV programs, and 20 large newspapers and magazines, financed by the largest monopolies of the military-industrial complex. All this helps reactionary imperialist circles and the Pentagon actively engage in extensive preparations for war.

German imperialism once took the path of unconcealed international brigandage and violence. U.S. imperialism is taking this same road. Military expenditures are increasing rapidly, and international terrorism and outright military intervention in the affairs of independent nations are becoming instruments of foreign policy. The U.S. declares many regions of the world to be a sphere of vital U.S. interests, in which Washington, artificially creating focal points of tension, is building up its military presence thousands of miles from U.S. soil.

Seizure of Grenada by the United States, U.S. military brigandage in Lebanon, and subversive terrorist actions against other countries of the world -- all this is reminiscent of the Hitlerites' actions. And how can one help but recall the adventurism and obscurantism on the part of the bosses of the "Third Reich" when one observes today the efforts of the present U.S. Administration to deploy on the soil of a number of West European countries new U.S. first-strike nuclear missile weapons targeted at the Soviet Union and the nations of the socialist community?

"Fire at the Russians!" This command to U.S. military personnel is being heard on the ground and in the air with increasing frequency. A program called "Aggressor" is being actively implemented in the U.S. Air Force. Just what is this program? It consists in utilizing specially formed air squadrons

at exercises, the aircraft of which, painted to resemble Soviet Migs, have been given the official designation "Aggressor." The flight personnel of these subunits have been taught "Russian" air combat tactics. In addition to "Aggressor" squadrons, simulated Soviet missile launchers, tanks, armored personnel carriers, etc are used at exercises.

The so-called "Confrontation" program also promotes the objective of kindling in Americans, especially young people, hatred toward the Soviet people and their Armed Forces. This program provides for U.S. military personnel, dressed in Soviet military uniform, to travel to schools and colleges, presenting lectures in which they expound... "the aggressive military doctrine of the USSR."

I do not believe there is any need to remind the reader that provocative actions of this kind grossly violate generally accepted standards of international law as well as elementary human notions of decency. The increasing activeness of neo-Nazis and revanchists obliges us to maintain the highest level of vigilance toward their intrigues and resolutely to expose all attempts to whitewash Hitler and his bloody war machine.

We must not forget the crimes of fascism, for fascism represents violence, terror, and murder. It is a synonym for war and aggression. The ashes of the victims who were tortured and burned by Hitler's butchers cry out in our hearts, just as the blood of the victims of aggression perpetrated by the Israeli "hawks" and their patrons in Lebanon cry out, as do the patriot-victims in Chile and Honduras, Vietnam and Angola.

The peace-seeking foreign policy of the Soviet Union and the other nations of the socialist community is of fundamental importance in the struggle against the ultrareactionary forces of imperialism. It is a policy of international detente. It opens up new opportunities for a broad, mass offensive against neofascism and enables us to strengthen to an even greater degree the international antiimperialist, antifascist solidarity of the revolutionary fighters for peace, democracy, and socialism.

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## HELICOPTER SQUADRON POLITICAL OFFICER PROFILED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 12-13

[Article by Col G. Il'in: "Right to Confidence"]

[Text] The tactical situation was becoming more complicated. Moving up reserves, the "aggressor" had stalled the advance of our ground subunits and had forced them to shift to the defense. Taking advantage of weather which was unfavorable for air activities, he had concentrated considerable forces in a narrow sector of the scenario-determined battle line and, launching a surprise night assault, had compelled the forward subunits of the defending force to withdraw. The "aggressor's" reserves poured into the breach.

An airborne assault team which had arrived at the airfield was assigned the mission to stop the breakthrough. A helicopter squadron was to land the assault force behind "aggressor" lines. The regimental commander's decision was dictated primarily by adverse weather conditions. The low cloud cover and thick haze demanded a high degree of skill by the aircrews, which were capable of flying a mission at ground-hugging height. In addition, the pilots had to possess a consummate mastery of antiaircraft artillery and SAM evasion maneuvers in two-ship formations.

The flying proficiency of the squadron's aviators was fully up to these requirements. Every other pilot in this squadron is a military pilot 1st class, with master proficiency in combat flying, with a performance rating of excellent. Teamwork and coordination had been developed to a precision edge by aircrews, 2-ship elements, and sections. They are distinguished by precision combat flying and total mutual comprehension in the air.

As dawn was breaking the helicopters, loaded with assault troopers, stood ready for departure. The pilots were waiting for the order to go. Suddenly they were given the following scenario change: "The squadron commander has been disabled. Major Kizhevatov is to take command."

The inspecting officer knew that officer A. Kizhevatov was the deputy commander for political affairs. He quite reasonably figured, however, that in an actual combat environment such a situation was entirely possible. And

who other than he, Major Kizhevatov, a combat pilot 1st class and instructor, should lead the men into combat!

The unexpected order did not catch the deputy commander for political affairs napping. When preparing for flight operations together with the commanding officer on the eve of the exercise, he had thoroughly studied the general plan and specific features of the operation and had personally taken part in determination of the route and devices to be used for penetrating "aggressor" air defense.

...Observing the specified separation spacings, the helicopters headed off into the murky skies. The leader precisely maintained the prescribed flight configuration. He was well aware of the responsibility resting on his shoulders. If for some reason the delivery of the assault force were unsuccessful, they would not only have doubts about the commander capabilities of the deputy commander for political affairs but also about the combat efficiency of the entire subunit. "What's this 'if it fails'?" The major brushed aside the nagging doubt. "The orders have been given and shall be executed!"

The thick haze and low cloud cover made it difficult to maintain their bearings, while the proximity of the ground demanded extremely close attention. The aircrews were maintaining radio silence in order not to give themselves away prematurely. They determined passage of the "battle line" from antiaircraft gun flashes, puffs of smoke, and a burning field. Spotting the objective dead ahead, Kizhevatov fired a number of rockets, and the assault troopers opened up automatic fire through the ports. Massive delivery of concentrated fire from the helicopters within the narrow passage sector enabled them to cross the "battle line" unscathed. Rigorously following the devised plan, the deputy commander for political affairs brought the squadron to the designated point, put the assault troopers down, and a few minutes later landed at the alternate field. Mission accomplished. The commanding officer was first to congratulate the deputy commander for political affairs on the successful mission.

Following the tactical exercise I met with the men involved. We talked about flight operations, aviation personnel service-related activities and off-duty routine. And when the subject of Major Kizhevatov, squadron deputy commander for political affairs, came up, the men waxed enthusiastic. They said many good things about him. He had prepared one of the men to the level of pilot 2nd class, another he had helped keep his family together at a critical moment, and another he had advised (and he does not regret that decision today) to remain in the Armed Forces. Political section officer party member Osip Petrovich Lyubchenko is a man of few words who is sparing of praise, but he went on and on about Kizhevatov: "A thinking political worker, an excellent pilot, a responsive comrade. Men will go through fire and water for such an officer."

We met Anatoliy Alekseyevich in the party committee secretary's office. Officers, warrant officers, and the chairman of the women's council were settling some important matters.

"This is Comrade Kizhevatov," the officer was introduced by party committee secretary Maj V. Yegorov.

An officer of medium stature and military bearing, of open countenance and a face showing strength of will, stood before me. We struck up a conversation. He said little about himself. He had graduated from the Syzran Higher Military Aviation School for Pilots with a gold medal. He had been awarded the Order of the Red Star for successes in combat and political training, and he was enrolled as a correspondence student in the first year of the Military Political Academy imeni V. I. Lenin. He did, however, have many interesting things to relate about his fellow soldiers. He recalled with gratitude his favorite commander, officer Anatoliy Ivanovich Baykin, from whom he had learned to remain cool and composed in emergency situations, as well as the ability to work with others.

"Once after a check ride," Kizhevatov related, "I proceeded to upbraid an aircraft commander for flaws in his piloting technique. He walked away angry and upset. Anatoliy Ivanovich came up to me and said: 'To listen to you, this pilot should be grounded permanently.' 'What do you mean, grounded permanently?' I replied. 'He'll come around!' 'Then why do you embarrass him in front of his crew? How is he going to be able to command his men after this?' I realized that I had been guilty of tactlessness. I apologized to my subordinate."

...Maj A. Kizhevatov did not have an easy time of it at first in the position of squadron deputy commander for political affairs. He labored to find the proper answer in each specific case, and he pondered the question of how he could do a better job of performing his new duties. Of course they are spelled out in regulations. But can all the nuances and shades of the situations pertaining to duty-related matters and off-duty routine be covered in written regulations? At first he attempted to deal with a great many matters at once, became carried away with enthusiasm, did a great deal of work, but produced few tangible results. Party member A. Shurskiy was very helpful in getting through this period of job familiarization. Kizhevatov talked frankly about his failures with Shurskiy.

"Try not to scatter your energies," the experienced political worker advised him. "Make sure you follow through on every decision. And do not do everything yourself; work-load party members, and assign tasks to Komsomol activists. You have a great many helpers, and the main thing is to guide their activities skillfully. First and foremost seek to ensure that party members are exemplary in performance of their job-related functions and party duty. This is very important for effective organization of the training and indoctrination process, prompt and timely meeting of socialist pledges by subordinates. Come to me with any problems. We'll talk it over...."

Anatoliy noted initial successes after 6 months. The flying technique of the young pilots improved, fewer deficiencies were noted in readying equipment for flight operations, and there were no longer any aircraft near-mishap situations through the fault of the men.

Of course not everything works out as one might wish. Sr Lts A. Bulgakov and I. Belov still cause grief to the deputy commander for political affairs. These pilots have good ability, but a lack of inner composure and a sometimes thoughtless attitude toward their job are hindering their professional growth.

"Once I tried to work on Bulgakov's self-esteem," related Anatoliy Alekseyevich. "I cited as an example the development of his fellow student Captain Skorikov, who had already been promoted to section commander. But it did not work. To date there has been little change for the better. But I shall keep plugging away. I shall endeavor to help both become good commanders."

This firm faith in people, in their as yet undiscovered creative abilities, in the ability to find resources and reserve potential for growth in professional expertise, brings the deputy commander for political affairs closer to his men and creates an atmosphere of mutual understanding and military comradeship. People see Kizhevavov as a good helper in a difficult job. If necessary, Anatoliy Alekseyevich will also take part in readying a helicopter for departure, and he is capable of representing the interests of the military collective before the authorities. Nor does he forget about off-duty life: he will help get a child enrolled in kindergarten, will concern himself with getting the heat turned on in his men's quarters, and he will organize a cultural excursion.

Major Kizhevavov works with a full effort and utilizes every minute wisely. He is fully demanding as regards job-related activities. But he sees his main task as leading others. The goal is a high degree of squadron combat readiness. The basic method is personal example.

At the end of last year the squadron was close to being rated excellent in all categories, and it is presently advancing confidently toward the cherished goal.

...Major Kizhevavov took out a notepad and glanced at his watch. I realized that it was time to take my leave.

"I have to go to the BOQ dormitory," Anatoliy Alekseyevich apologized, bade farewell and hurried out of the office.

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## AIR FORCES KOMSOMOL MEMBERS RESPOND TO CONFERENCE RECOMMENDATIONS

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[Article, published under the heading "Implementing the Recommendations of the Armed Forces Conference of Komsomol Organization Secretaries," by Lt Col S. Reutov, assistant chief of the Air Forces Political Directorate for Komsomol affairs, member of All-Union Komsomol Central Committee: "We Took It to Heart and Shall Respond With Deeds"]

[Text] The Armed Forces Conference of Komsomol Organization Secretaries has become an important page in the biography of Komsomol in the military and a combat review of the achievements of the young defenders of the socialist homeland, who are implementing the decisions of the 26th CPSU Congress and 19th All-Union Komsomol Congress, and a summarization of results of socialist competition to honor in a worthy manner the 60th anniversary of conferment of the name of V. I. Lenin on Komsomol.

The Air Forces sent more than 150 aviation personnel to the conference. The makeup of the participants reflected the indissoluble bond between and succession of generations. They included combat veterans twice Hero of the Soviet Union Mar Avn N. Skomorokhov, three times Hero of the Soviet Union Col Gen Avn I. Kozhedub, Air Forces veterans and hero-internationalists of our time V. Shcherbakov and Ye. Zel'nyakov, decorated aviators V. Lazebnik and M. Stepanov, youth leaders of excellent-rated units and subunits officers G. Chernyshov, V. Volkunovich, S. Trofimov, V. Andriyenko, and others.

Fully cognizant of the critical importance of the tasks assigned to Komsomol by the party in the area of defense of the achievements of socialism, young aviation personnel marked this important event in Komsomol affairs with many fine deeds. Every other Komsomol member in the Air Forces is excellent-rated in combat and political training, one out of three has mastered a related occupational specialty, more than 80% of young military personnel have become proficiency-rated specialists, and 86% have met Military Sports Program performance standards. Right-flankers in socialist competition include the outfits in which officers B. Basov, S. Gapishko, A. Leunov, S. Khor'kov, V. Kisel', and G. Koshelenko serve as Komsomol leaders.

The profound, interesting address by CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, at this forum of Armed Forces Komsomol members, has become a fighting program of action for commanders, political agencies, party and Komsomol organizations pertaining to further increasing the combat readiness of units and subunits and indoctrination of military personnel in a spirit of selfless dedication to the great Leninist cause, life-giving Soviet patriotism and socialist internationalism, readiness and willingness to perform deeds in the name of the homeland.

Study of the proceedings of the Armed Forces Conference presently occupies the attention focus of all Air Forces personnel. Conferees, commanders, party and Komsomol workers are explaining to aviation personnel the basic points of the address given by CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, and the reports presented by USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo, and Army Gen A. A. Yepishev, chief of the Main Political Directorate of the Soviet Army and Navy.

Komsomol organization work has become appreciably enlivened in Air Forces units and subunits. Its content and forms are becoming enriched, and it is becoming more specific, focused on accomplishing the principal tasks formulated at the conference.

An example of this is the outfit in which officer V. Ul'yanov serves. In this outfit the Komsomol workers and activists do a great deal of organizational and political work pertaining to ensuring exemplary performance by Komsomol members in studying the conference proceedings in the political training system, at evening universities of Marxism-Leninism, and party schools, Komsomol political education groups and seminars. Dozens of get-togethers between aviation personnel and conference participants have been held. Komsomol-youth lecture agencies and speaker groups under the auspices of Komsomol committees, "Our Lenin Komsomol" groups and volunteer propagandists have become actively involved in publicizing conference resolutions.

Conference recommendations on the need for a close unity of ideological-political, military and moral/ethical indoctrination of aviation personnel have experienced specific embodiment and further development in this outfit. Conferences on theory for young officers, individual interviews with and presentation of reports by Komsomol members in the course of certification of participants in the Leninist examination entitled "Implementing the Decisions of the 26th CPSU Congress!" have become mandatory in Komsomol organizations. Komsomol workers correctly focus Komsomol activists and members on the fact that analysis and realization of the ideological-theoretical issues raised at the Armed Forces conference is not something to be accomplished in a single day; it is intended for an extended period of time. Main efforts are being concentrated on further development of youth enthusiasm aroused by the conference resolutions, on increasing combat and social activeness on the part of aviation personnel, and extensive dissemination of patriotic movements and initiatives.

Precisely such an approach enabled the regimental Komsomol organization -- initiator of socialist competition in the Air Forces -- substantially to broaden the area of ideological influence on military personnel and to increase the effectiveness of ideological-political work. Taking part in the shock-work youth watch in honor of the 60th anniversary of conferment of the name of V. I. Lenin on Komsomol, unit Komsomol members have accomplished a great deal. The Komsomol committee, headed by Capt S. Miroshnichenko, acts as a combat center for the organization's affairs, is the initiator of all interesting patriotic undertakings, and devotes much attention to giving assistance to commanders and political workers in mobilizing military personnel for maintaining a high degree of political vigilance and combat readiness and improving air proficiency in strict conformity with regulations governing flight operations. Komsomol members regularly present reports at Komsomol committee and buro meetings on their progress in mastering job duties and their aircraft, and in learning mishap-free operations. Activists are taking part in synthesis and adoption of the advanced know-how of Komsomol members who have distinguished themselves at exercises, during flight operations, and in accomplishing combat training missions. In conformity with the conference recommendations, primary emphasis is placed on stepping up work with Komsomol member officers, especially as regards training in theory and improvement of professional skills and methods expertise.

Review-contests for the title "Best in Occupational Specialty" and competition for the privilege of flying a sortie in the place of a Hero of the Soviet Union and the privilege of servicing such a sortie have become traditional. Young officers head Komsomol flight safety stations, technical study groups, conduct vigorous military-technical publicity, and organize technical quizzes and question-and-answer evenings on knowledge of the combat equipment. The Komsomol organization takes firmly to task in a Komsomol manner those who are guilty of unnecessary relaxation of demands. All forms of work within Komsomol here are directed toward ensuring that each and every officer-Komsomol member displays a personal example in mastering equipment and weapons and in military labor.

This has a positive effect on the professional training of young pilots and technicians. In the course of tactical air exercises and mock combat sorties they have displayed increased skill, performing missions with marks of excellent and good. Almost half of the Komsomol members in the unit have mastered related occupational specialties. The number of increased proficiency-rating specialists is up one fourth over the last winter training period. Near-mishap situations through the fault of Komsomol members have been eliminated. Regimental personnel confirmed their rating of excellent at the six-months performance evaluation.

Nor are the men in the other units falling behind the initiators of competition in the Air Forces. We could name, for example, the outfits in which Komsomol activists officers V. Kolesov, V. Shashkun, and V. Mal'tsev serve.

In preparing for the Armed Forces Conference of Komsomol Organization Secretaries and for marking the 60th anniversary of conferment of the name of V. I. Lenin on Komsomol, young aviation personnel of Air Forces units and

subunits made upgraded socialist pledges. Organizing assistance in their implementation, Komsomol committees concentrated attention on boosting proficiency ratings, encouraging youth technical innovation, and on youth participation in improving training facilities and in efficiency innovation activities. Initiative and competitiveness in accomplishing specific targets and combat training performance standards by Komsomol members were graphically manifested in undertakings which are still being sustained in these outfits: "A high level of knowledge and expertise on new aircraft by young personnel," "Boosted proficiency rating for each and every Komsomol member," "Training facilities are a Komsomol concern," plus others. Their effectiveness is in evidence: tough pledges made by excellent-rated units have been accomplished, aviation personnel are successfully mastering the combat equipment, and the ranks of high proficiency-rating specialists are swelling. Komsomol members are credited with one out of every two efficiency innovation suggestions.

Some Komsomol organizations, however, do not always correctly define their place and role in the campaign to increase the effectiveness of socialist competition. Some of them fail to help Komsomol members in drawing up socialist pledges which are tough and at the same time realistic, they fail to develop in members responsibility for meeting pledges, and show a formalistic attitude toward synthesis and dissemination of advanced know-how pertaining to work and training. Deserving of such criticism, for example, are the Komsomol organizations in which officers N. Chebanov, S. Kozlov, and S. Logvinenko work. In these outfits a lessening of demandingness on Komsomol members and an atmosphere of resting on one's laurels, aimless rushing around and paper shuffling have led to a situation where some former excellent-rated individuals have become conceited, have begun violating discipline, lagging behind in combat training and, what is even worse, in a number of areas have retrogressed. As a result they are showing no movement forward.

It was particularly forcefully and sharply stressed in the address by the USSR minister of defense at the Armed Forces Conference of Komsomol Organization Secretaries that successes in military labor and socialist competition are inconceivable without firm military discipline. The conference called upon Komsomol workers to redouble their efforts in the campaign for its further strengthening, maintenance of firm observance of regulations, and uniting of military collectives.

Komsomol organizations in the Air Forces have done a great deal of work in this area. Fine things are being said about the doings of the outfits in which I. Cherkasov, V. Bespalov, P. Bazanov, N. Spirin, and others serve as Komsomol workers. For more than 5 years now there have been no accidents in these units through the fault of Komsomol members and young servicemen. They have totally eliminated violations of military discipline involving rudeness and an uncomradely attitude toward one's fellow soldiers. For many years now they have produced high, stable results in combat and political training of Komsomol members.

The Komsomol organizations in which comrades N. Sviridov, A. Cheshin, V. Levchenko, and N. Darchenko serve are operating in the same conditions, but performance indices are exactly opposite, and here is why. The practice of rush campaigns has taken hold in efforts connected with strengthening

discipline: if gross violations occur, they loudly sound the alarm, but when no such violations are occurring, things are quiet in the Komsomol organizations.

Practical experience convinces us that wherever constant concern is shown for the moral indoctrination of young aviation personnel, for maintaining firm observance of regulations, where an atmosphere of stringent demandingness has been created, there is no soil for discipline violations, and the collective is more cohesive.

The work experience of the Komsomol members in the unit in which Sr Lt Yu. Kas'yanenko is a member of the Komsomol committee is instructive. The Komsomol organization utilizes an arsenal of diversified means of indoctrination in order to instill in each and every young aviator a vigorous experiential attitude and to develop in him a conscientious and responsible attitude toward his military duty, pride in service in the Air Forces, and a feeling of comradeship and friendship, honesty and an implacable attitude toward shortcomings. In that outfit they are constantly conducting Komsomol-youth activities to publicize the fighting traditions of the Air Forces, standards of Communist morality, development of a high level of military knowledgeability in young aviation personnel, and explanation to personnel of the demands of general military regulations. At regularly-held Komsomol meetings with the agenda "Tell about yourselves," and at specific-topic evening events entitled "I Introduce Myself to the Group" and "Your Hand, Comrade," as a rule there takes place a frank discussion of mutual relations in the outfit, of performance leaders and laggards. The center of attention of the Komsomol committee and buro is focused on each and every member, with his needs, interests, spiritual and intellectual aspirations.

Officers N. Konstantinovskiy and V. Kozin, for example, had a difficult time during their period of familiarization and breaking-in. Back at service school their comrades criticized them for negative habits. In the regiment, however, these Komsomol members were held strictly to account for their misdeeds. The commanding officer and experienced specialists helped them in their study of military affairs, and activists enlisted them into volunteer activities. Today both officers are excellent performers in training, specialists 1st class, and devote a great deal of attention to shaping up the new men. They have a great deal to communicate to and teach these recent pilot cadets.

Practical experience irrefutably attests to the fact that it is essential to study, synthesize and universally adopt in a practical manner the advanced know-how of the finest Komsomol organizations.

It was emphasized at the Armed Forces Conference of Komsomol Organization Secretaries that work effectiveness depends in large measure on the degree of training and preparation of Komsomol workers and activists as well as their sense of responsibility for the job at hand. Political agencies, party and Komsomol organizations, guided by the conference recommendations, are devoting the closest attention to matters pertaining to selection and training of Komsomol cadres, further improvement in organization and conduct of training

conferences, seminars, and classes, especially with the direct organizers of Komsomol work.

Young Air Forces personnel have set about with great enthusiasm to implement the conference demands. They consider it their patriotic duty to strengthen the nation's defense capability together with commanders and party members, and to work tirelessly to achieve further increase in the combat readiness of the Air Forces. Enhancing their work effectiveness, Komsomol organizations are demonstrating with redoubled forcefulness their faithfulness to the behests of V. I. Lenin and the ideals of the Communist Party, as well as their willingness and readiness to carry out with honor responsible tasks pertaining to defending the socialist homeland.

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## MAINTENANCE CHIEF FINDS AFTERBURNER AUTOMATIC THRUST CONTROL MISADJUSTMENT

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) p 20

[Article, published under the heading "Constant Attention to Flight Safety," by Maj Yu. Pobedin: "The Group Chief Did Not Err"]

[Text] "You are wrong, Aleksey Konstantinovich. There is nothing wrong with the airplane," the pilot angrily retorted, arguing with experienced maintenance specialist Guards Captain Zakharov, chief of the monitoring equipment servicing and data interpretation group. "It is our fault: we failed to lock the throttle when cutting in the afterburner."

"That's right," his comrade chimed in. "We should have locked the throttle. The aircraft vibrates more violently when the afterburner is lit. The throttle slipped back a bit. But everything was normal during the flight...."

Zakharov smiled and led the fliers over to the test bench.

"Take a look," he turned to the aviators. Here are two tapes: one standard, the other one yours. Here is where you lit the afterburner. This is indicated by the breakup of the trace. Here is the rpm trace. It clearly shows a drop in rpm. The cause of this must be determined. I reported this fact to the senior flight operations engineer and requested that the aircraft be grounded."

It would seem that the group chief had sufficiently convincingly substantiated his decision. The flight personnel persisted, however. They kept claiming that there was no problem and that they themselves were to blame....

Officer Zakharov understood them well. There was still a lot of time remaining to the end of the flight operations shift, and they did not want to remain "without a horse," so to say. Having spotted the brief rpm drop on the monitoring tape, however, the group chief could not allow the aircraft into the air. He had to ground it, for any error could have serious consequences. Aleksey Konstantinovich never compromises with his conscience. The maintenance specialists would check out his hypothesis, and it would become clear whether the aircraft should be returned to service. And when it is necessary to resolve some question being debated or clarify some puzzling item

in the operation of aircraft equipment, aviation personnel come to him. Aleksey Konstantinovich tries to find the precise answer.

Recently, for example, while checking the flight recorder tapes following a training sortie, Zakharov noticed that the tape from the aircraft of Military Pilot 1st Class Gds Lt Col O. Timofeyev showed at one point a sudden jump in exhaust gas temperature. When he reported this fact to the senior flight operations engineer, the latter ordered that the engine be tested in all operating modes. A thorough and comprehensive check determined that the aircraft was in good working order. The senior engineer asked Zakharov to determine whether the pilot had followed the correct procedures during the flight.

"We'll do our best to get to the bottom of things," the officer replied.

But how could he determine why the tape showed a temperature jump. Aleksey Konstantinovich compared the tapes recorded on this aircraft during other flights, but he noted nothing suspicious. But what about a comparison by time of flight elements which were being executed not only by Timofeyev but by his leader as well? A few minutes later the following report was received at the engineer command post: "The equipment operated without any deviations. The pilot made no mistakes."

Reviewing the entire flight phase by phase, the group chief learned that while in the air the leader had instructed Timofeyev to check operation of the dangerous angles of attack warning system. During his check of the system, the reading on the tape looked like a brief gas temperature jump downstream of the turbine.

Frequently Zakharov helps pilots spot errors in piloting technique and combat procedures, helping them correct these mistakes, and thus improving flight safety.

On one occasion when he was analyzing flight recorder data, Aleksey Konstantinovich noted that one of the pilots had executed an Immelman at maximum thrust, but not with afterburner, as the procedures specified. On another occasion he noted that during aerial combat an aircraft had gone beyond the allowable angle of attack. The officer immediately reported this fact to the pilot and to his superior. The pilot soon corrected his deficiencies, thanks to the fact that the problem had been promptly spotted.

Party member Zakharov willingly shares his wealth of experience with air and ground personnel. Aviation engineer service specialists learn from him competently to read testing equipment records and flight recorder tapes. And it is extremely important to be able to read and flawlessly to analyze monitoring tapes.

Guards Captain Zakharov skillfully teaches and indoctrinates his subordinates. There was a time when group senior aircraft mechanic Gds WO V. Virich was insufficiently skilled in determining flight parameters from the tapes. Aleksey Konstantinovich devoted a great deal of time to him until he learned to interpret monitoring tapes correctly and confidently. In the teaching

process he used standard tapes and fashioned display stands on which he showed how flight parameters are recorded on tape and their specific characteristics.

...Flight operations were continuing. Aviation personnel were extremely busy.

"Captain Zakharov, report to the engineer's command post," the voice of senior flight operations engineer Gds Maj G. Supko came over the public address system.

The pilots, who were continuing to argue their point of view, gazed questioningly at Aleksey Konstantinovich.

"Wait here for me," the officer requested, and left.

When he entered the engineer command post room, Supko said with satisfaction: "Thank you, Aleksey Konstantinovich. Your hypothesis proved correct. The people in the technical maintenance unit tested the engine in all operating modes. They discovered an afterburner automatic thrust control misadjustment...."

A moment later Zakharov headed back to the pilots to clear up the argument.

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## COMMUNICATIONS SATELLITE APPLICATIONS REVIEWED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) p 21

[Article, published under the heading "The Space Program Serving Science and the Economy," by G. Sapov: "Effectiveness of Space Systems"]

[Text] More and more branches and sectors of the nation's economy are utilizing satellite-obtained information. Specialists in the field of meteorology, communications, astronomy, medicine, and earth resources today rely on advances in space technology. The designing, construction and practical utilization of new applied hardware is one of the most important results of space exploration and exploitation.

The substantive value of reliable weather forecasts determines the economic effectiveness of utilization of weather satellites. Information from these satellites includes TV imagery of cloud cover and the earth's surface in the visible and infrared bands, as well as multiband radiation emissions of the earth-atmosphere system. Information is obtained from 15% of the earth's total surface in a single satellite revolution. The Meteor satellite system, for example, which has been in successful operation in the USSR for the past 16 years now, saves the nation's economy a billion rubles each year. It was precisely information transmitted by weather satellites which made it possible to extract vessels trapped in the ice in the Chuckchee Sea during last year's navigation season.

Investigation of earth resources from space produces considerable effect. Information obtained from orbit is of great practical value in harvest forecasting, estimating forest resources, and geological exploration for minerals.

The cost of satellite-imagery surveying of the earth's surface per unit area is 10 to 15 times less than aerial photographic surveying. This is confirmed by practical experience in planning, construction and development of territorial-production complexes in Eastern Siberia (the BAM zone), Kazakhstan, and Central Asia.

Provision of services for marine navigation is becoming one of the most important areas of satellite applications. Speed and reliability are the

principal advantages of satellite communications. They provide the capability to organize guaranteed provision of current weather information to ships at sea, which enables them to select the most advantageous and safest routes, and leads to considerable savings in time underway. This greatly improves operating conditions for the cargo, passenger and fishing fleet, reduces operating costs, and increases profitability of maritime shipping.

Since February 1982 vessels in the Atlantic, Pacific and Indian oceans have been served by the international marine satellite communications organization Inmarsat. Membership includes the world's 38 largest powers, which own 85 percent of total world vessel tonnage.

At the present time, according to Lloyd's Register of Shipping, each year approximately 350 vessels go down in the World Ocean. Many do not even have time to send a distress signal and disappear without a trace. The COSPACSARSAT international space system, developed jointly by Soviet, U.S., French and Canadian specialists, is substantially increasing the effectiveness of search for vessels and aircraft in distress in the World Ocean. The equipment makes it possible to determine the location of ships and vessels in distress with an accuracy of 3-5 km. A total of 137 persons were rescued just during the process of bringing the system up to fully operational status. It is planned to equip many of the world's ships and aircraft with emergency locator beacons in the near future.

In recent years there has been noted a trend toward development of multipurpose satellites and satellite geostationary platforms. These would be assigned an entire group of tasks: direct television broadcasting (NTV), communications, meteorology, navigation, and earth resources. They will weigh from 3,000 to 8,000 kilograms and carry on-board power supplies ranging from 2 to 12 kilowatts.

One specific feature of satellite communication systems is the fact that capital costs are not related to the distance information must be transmitted. They are employed most efficiently for transmitting one-way information notices and advisories, television, audio broadcasting, and newspaper photofacsimile. The newspaper always has been and continues to be a practical periodical publication, one of the principal mass information media, an instrument of political propaganda, and a channel for dissemination of advanced know-how. More than 8,000 newspapers, representing a combined circulation of 173 million copies, are currently published in the USSR. And it is satellites which have enabled the residents of cities, towns and villages in Siberia and the Far East to receive same-day delivery of central newspapers. Up to 15 different newspapers are currently being transmitted by satellite link; Moskva earth stations, with a 2.5 meter diameter dish, make it possible to receive photofacsimile transmissions directly at printing plants. The satellite-link newspaper distribution network is steadily growing.

Five-zone television broadcasting, introduced in the USSR in the current five-year plan, is based on the Moskva, Orbita, and Ekran satellite distribution systems. They make it possible to transmit from Moscow Central Television national programming, programs 1 and 2, at a time convenient for the TV viewers of the country's various regions.

The network of master telephone-telegraph communications channels is continuing to expand, utilizing promising methods of time and frequency multiple-station access. New satellite links between major administrative-economic centers in the European part of the USSR, the Far East and Central Asia are constantly coming on-line. All this is helping establish a Unified Nationwide Automated Network.

We should note that the above-mentioned areas of applied-economic utilization of space technology represent only a small part of the potential for the space program to exert an influence on the economy and international relations.

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## COCKPIT SIMULATOR TRAINING ALLOWS STUDENTS TO SOLO SOONER

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 22-23

[Article, published under the heading "Military Educational Institution Affairs," by Col (Res) S. Lyadov and Lt Col Med Serv E. Kozlovskiy, candidate of medical sciences: "What the Experiment Showed"]

[Text] There is a search in progress at many schools for ways to achieve more effective and efficient utilization of simulator-type training equipment. In particular, an experiment was conducted at the Chernigov Higher Military Aviation School for Pilots imeni Lenin Komsomol to determine the effect of practice sessions by first-year cadets on the TL-39 on reducing the number of dual-instruction flights during the period running from commencement of ground school to first solo. At the same time a determination of the economic effectiveness of simulator training was being made.

In devising a program for training student pilots on the simulator, we determined the optimal number of training sessions on individual elements of flight and sought the most efficient learning methods and techniques, which make it possible to form positive, solid skills, to lessen the acquisition of adverse habits, and to diminish their influence on the quality of execution of flight assignments in the actual aircraft. The studies also made it possible to formulate some standard estimates of simulator training results taking new learning methods and techniques into account.

For the purpose of experimental verification of the devised methodology, the psychophysiological laboratory people selected 72 cadets from occupational-psychological selection (PPO) group two with average performance indices. This body was divided into three equal groups, the student pilots in which "logged" 30, 15, and 0 hours on the TL-39 prior to commencement of in-air flight training. In order to obtain the most objective data in conformity with a uniform methodology, 22 teams were formed from the three groups, according to the following principle: one instructor teaches student pilots with 30, 15, and 0 hours of training on the TL-39.

As is indicated by flight training experience involving various elements of the dual-instruction program, the level of simulator training exerts considerable influence on the end results.

As early as the period of combined training classes, instructors in the flight training sections (ULO) and instructor pilots immediately noticed a difference in the student pilots' level of preparation. The overwhelming majority of those who had "logged" 30 hours on the simulator knowledgeably answered questions connected with aircraft operation, were less tense and nervous when starting the engines, had no difficulty finding the various instruments, and ably read the instruments. Student pilots who had not trained on the simulator displayed considerable nervousness and tension when starting the engines, became confused more frequently, were excessively fidgety or constrained in their actions, and for this reason made more mistakes and errors in sequence of cockpit procedures. They did a worse job of reading the instruments, and some student pilots had difficulty locating instruments.

In the course of ground school the members of the group with zero simulator training displayed considerably more deficiencies than the students who had trained on the TL-39 (see Table 1), and more than half of the time allocated to the entire group of student pilots was devoted to them. Virtually every member of the "zero" group required additional training sessions totaling up to 4 hours. Students in the "15" group showed fewer deficiencies in assimilating the material than the students in the "zero" group. Additional training sessions, running from 30 minutes to 3 hours, however, were also conducted with many of them. Those who showed poor progress on the simulators required particular attention. Students in the "30" group showed one half to one third as many deficiencies as the students in the other groups.

Table 1. Performance Level of Students With Differing Level of Training on the Simulator (as graded by flight personnel).

«Налет» на ТЛ-39, (в часах)	(1)	Количество курсантов (в процентах), имеющих недостатки в изучении:		
		(3)авиатехники	(4)особых случаев	(5)радиообмена
0		72	67	60
15		65	70	50
30		27	27	20

Key: 1. Hours "logged" on TL-39; 2. Number of students (percentage) with deficiencies in study of; 3. Aircraft equipment; 4. Emergency procedures; 5. Radio communications

Practice sessions on the TL-39 to work on holding a heading and on executing turns are a fundamental condition for successfully mastering flying techniques. One can also determine with a certain degree of accuracy the aptitude of the future pilots according to the results of simulator training sessions.

Students in the "30" group practiced a specified procedure or maneuver on the simulator until they achieved maximally stable results, whereby an increase in the number of practice sessions no longer has a significant effect on magnitude of performance error. Three fourths of the students in this group reached their "ceiling" after 7 to 10 practice sessions, while one fourth required from 11 to 15. This segment of the students showed greater errors in maintaining prescribed flight parameters.

The students in the "15" group performed from 6 to 7 similar practice sessions on the simulator with the artificial horizon disabled. They received information on the aircraft's spatial attitude primarily on the basis of the horizon line on the screen, maintaining flight parameters by monitoring the gauges. In our opinion this procedure makes it possible substantially to approximate to the conditions of actual flight the process of learning to distribute and shift one's attention.

On their first dual flight into the practice area, the students would perform a maneuver following a demonstration of that maneuver by the instructor. The results of the first and second actual flights, with performance of analogous procedures and maneuvers, enable us to determine the effectiveness of learning on the simulator (Diagram 1).

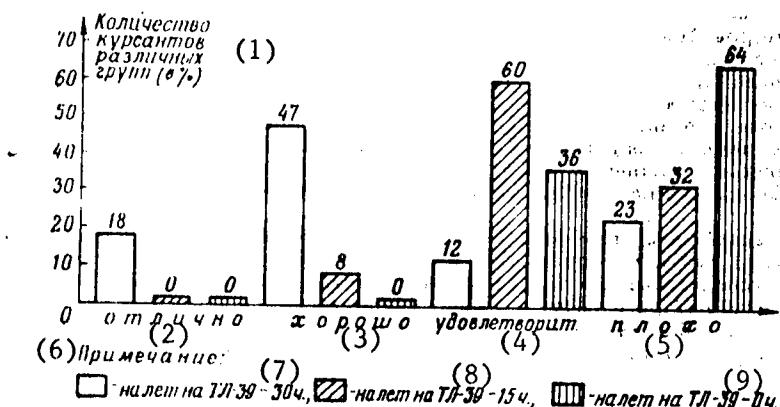


Diagram 1. Ratings of quality of performance of climb and level flight by students with differing level of training on the simulator.

Key: 1. Number of students of the various groups (percentage); 2. Excellent; 3. Good; 4. Satisfactory; 5. Poor; 6. Note; 7. 30 hours "logged" on TL-39; 8. 15 hours "logged" on TL-39; 9. Zero hours "logged" on TL-39

The overwhelming majority of students in the "30" and "15" groups met established performance standards for a mark of "satisfactory" on the first flight. According to the pilots' observations, errors were caused primarily by the psychological factor -- newness of the situation, unaccustomed sensations, natural nervousness and tenseness. The students of the "30" group

were less tense, since 65 percent of them performed the assignment with marks of "excellent" and "good." Only 8 percent of the students in the "15" group earned a mark of good (see Table 2).

Table 2.

(1)	Показатели	+Налет+ на тренажере		
		(2) (3) 30 часов	(4) 15 часов	(5) 0 часов
6	Наземная подготовка:			
7	курсанты, имеющие недостатки в знаниях (в процентах)	25	63	68
8	курсанты, показавшие знания (в процентах):			
9	хорошие и отличные	59	40	11
10	плохие	18	30	50
11	Полет на самолете Л-39:			
12	курсанты, получившие оценки за упражнение 2 (в процентах): 5 и 4	65	8	0
13	курсанты, получившие оценки за упражнение 4 (в процентах): 5 и 4	100	50	20
14	Средние оценки	4,5	3,2	3,1
15	Количество вывозных полетов по кругу:			
16	без АГД	52	64	69
17	с АГД	62	—	—
18	Курсанты, отчисленные по летной неуспеваемости (в процентах)	4,3	9	23,5

Key: 1. Indices; 2. "Logged" on simulator; 3. 30 hours; 4. 15 hours; 5. Zero hours; 6. Ground school; 7. Students with deficiencies in knowledge (percentages); 8. Students displaying knowledge (percentages); 9. Good and excellent; 10. Poor; 11. Flight on L-39 aircraft; 12. Students receiving marks for procedure 2 (percentages); 13. 5 and 4; 14. Students receiving marks for procedure 4 (percentages); 15. Average marks; 16. Number of dual sessions in landing pattern; 17. Without artificial horizon; 18. With artificial horizon; 19. Students washed out for poor marks in flying program (percentages)

During the second flight 88 percent of the students in the "30" group had performances earning them not less than a mark of good, while 80 percent of the students in the "15" group and all the remaining students in the "30" groups met the performance standard for a mark of satisfactory. The experiment showed that attention-shifting skills developed on the TL-39 remain virtually intact for a period of 3 to 4 months. Students in the "zero" group achieved performance results meriting a mark of satisfactory only after four flights on the given maneuver procedure.

Thus the experiment showed that with 30 hours "logged" on the simulator the number of actual flights to master a given procedure can be cut in half without detriment to quality of flying performance. With 15 hours "logged" on the TL-39, students took three such flights last year instead of the four flights previously required.

When the students were performing the first experimental flight on an actual aircraft, an interlinkage between time "logged" on the simulator and motion sickness in the air was unexpectedly discovered. More than one third of the students in the "zero" group and 4 percent in the "15" group experienced airsickness. This phenomenon was not noted in students of the "30" group. The reason for this resistance to airsickness in our opinion lies in the students' adaptation to visual stimuli coming from the TL screen during simulator flying and in acquisition of basic flying skills. The noted factors helped reduce tenseness in the first phase of the dual flight instruction program and diminish irritability of the vestibular mechanism. We feel that this phenomenon should be investigated and appropriate recommendations drawn up for training flight personnel.

The flight training program provides for more than 10 flights into the practice area to practice elementary maneuvers. Investigation of the effect of simulator sessions on practical execution of maneuvers was conducted by experienced pilots after 6 flights on the actual aircraft. Their results were graded strictly according to performance standards (Diagram 2).

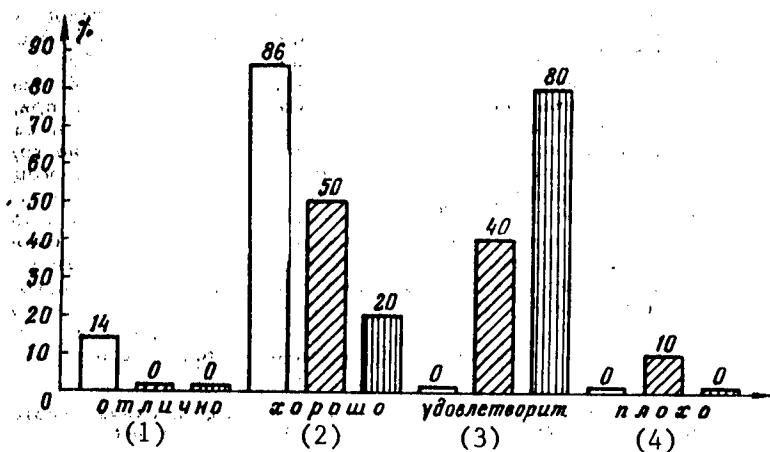


Diagram 2. Marks on quality of flight maneuver execution by students with differing level of simulator training on the sixth flight.

Key: 1. Excellent; 2. Good; 3. Satisfactory; 4. Poor

According to the gradings by flight personnel, the students of the "30" group, who had flown from 8 to 10 analogous practice sessions on the simulator, did well on all elementary maneuvers, themselves spotted their own errors and deliberately introduced deviations and corrected them in a competent manner. Their quality of performance of the flight maneuvers made it possible to approve practically all the students in this group for solo flight.

The students in the "15" group competently executed 30 and 45 degree banked turns after four practice sessions, but errors in holding altitude and airspeed brought them below a mark of good, while the majority of students received a mark of satisfactory on 60 degree banked turns, diving and steep

climb. For this reason 40 percent of the students could not be approved to fly solo to the practice area, since certain elements of the maneuvers had been graded unsatisfactory.

The students in the "zero" group executed 30 and 45 degree banked turns fairly well, but they failed to hold altitude and airspeed well enough to earn a grade of higher than satisfactory. One fifth of the students received a mark below satisfactory for holding altitude poorly. While executing the maneuvers they concentrated all their attention on the instrument readings to the detriment of visual orientation. They executed 60 degree banked turns only under the instructor's supervision, and performed diving and steep climbs with a mark of satisfactory. They clearly experienced difficulties in coordinating flight control and throttle movements. The level of proficiency of the students in this group was below requirements for approval to fly solo to the practice area.

Analysis showed that the number of dual-instruction flights to work on these maneuvers can be cut approximately in half for students of the "30" group without diminishing proficiency. Approximately the same results were obtained during flights in the pattern (Diagram 3), instrument flying under the IFR hood, in mastering the dual-instruction program, and immediately prior to the first solo.

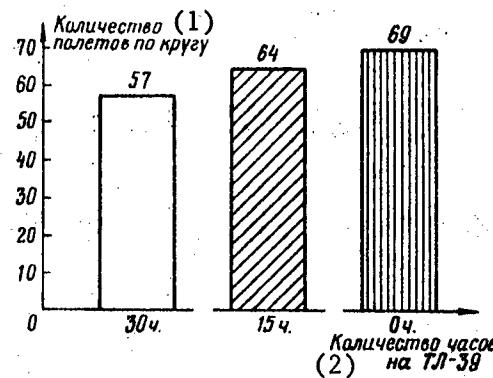


Diagram 3. Average number of dual-instruction sessions in the pattern prior to the first solo flight, in relation to time logged on the TL-39.

Key: 1 Number of training sessions in the pattern; 2. Number of hours on TL-39

The following conclusions can be drawn from this experiment in student pilot simulator basic flight training.

Training sessions on the simulator have a positive effect on the quality of mastery of the dual-instruction program on the actual aircraft. An increase in simulator time to 30 hours makes it possible to reduce the dual-instruction

program by approximately 7 hours even only with sessions in the practice area, without diminishing quality of preparation to solo.

A substantial volume of flying skills is formed when student pilots learn visual flying in the pattern on the simulator, which in turn makes it possible to reduce the number of dual-instruction flights without detriment to quality of the approach and landing. The skills formed on the simulator aid the student in more successfully mastering actual flying and, as a consequence, reduce the percentage of students washing out for failure to master flying skills (see Table 2).

Mastery of the flight training program on the aircraft is directly dependent on the quality of training sessions on the simulator. In addition, simulator training makes it possible to predict with a high degree of accuracy the aptitude of student pilots before they actually take to the air.

The cost of 30 hours of simulator training per first-year cadet on the TL-39 is approximately one seventh the cost of 1 hour of flying the L-39 aircraft. Nor is this the limit. At the same time calculations have shown that by training all first-year cadets on the simulator it is possible to eliminate approximately 15 flight operations shifts just involving flight training in the pattern, without diminishing the quality of flying proficiency.

Effectiveness of simulator training can be increased by means of further improving the system of planning, organization and methodology of conduct of training sessions, by increasing the relative simulator operation time and reducing the cost per hour of flight training.

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## LOSS-OF-CONTROL PROBLEM WITH SOVIET VTOL AIRCRAFT NOTED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 26-27

[Article, published under the heading "Visiting Our Comrades in Arms," by Maj V. Leskov: "Lasting Echo"]

[Text] The nose began to drop while the pilot was in hovering mode. The pilot pulled back on the controls, but the aircraft began to swing left. An attempt to stop the swing by applying right rudder was unsuccessful, and the turning motion continued. At this point the young pilot reduced throttle. A hard landing followed, collapsing the nose gear.

The initial judgment was that the accident had been caused by pilot error, that the pilot had lost control over the aircraft, which had not malfunctioned. Squadron commander Capt Ye. Matveyev was not in agreement with this conclusion, since in his opinion it did not reflect the truth.

Incidentally, often causes of air mishaps which differ in nature are lumped into standard categories, such as "pilot error," "lack of discipline," and "poor organization." And analysis of a specific incident sometimes boils down to fitting it into one of the ready categories.

While disagreeing with the conclusion that the reason for the mishap was that the pilot's level of proficiency was inadequate to the situation, Captain Matveyev did not entirely remove culpability from the instructor pilot. This officer considers experience to be an important instructor quality: both professional and life experience. He reached this conclusion from observing at work the senior commanders, instructors, and test pilots who had taught him to fly the VTOL aircraft.

Honored Test Pilot USSR O. Kononenko, for example, in training the first generation of "jump-jet" pilots, who included Matveyev, endeavored to explain the main points calmly and in an easily understandable manner, to provide the rudiments of knowledge. The pilot should be able to proceed further on his own, thinking through and analyzing his actions. But he always kept a close eye on his students' level of proficiency, and if necessary he would prompt them. Oleg Grigor'yevich liked to debate. Regardless of the age of his opponent, he debated on equal terms. Why argue with a lieutenant? This is

the way it is -- end of discussion. Kononenko, however, sought to have the young pilot independently reach the correct solution. This is an indication of a gifted educator.

When flying with him in a two-seater, the pilot sensed that there was an experienced and knowledgeable instructor sitting behind them, with whom there was nothing to fear. He would explain, demonstrate, and then give them the opportunity to do it themselves, taking over the controls only in an emergency. During the entire flight he would try to be as inconspicuous as possible. This is how top-rate instructors teach!

But there are instructors of another type as well. They instill fear in their students before they have even reached the aircraft. Cadet Ye. Matveyev had such an instructor in his first year at school. In the air, he would scream at the slightest mistake: "What do you think you're doing?!" He would correct the error himself and then order: "Hold it like this!" Any mistake by the student pilot would upset him, evoking an instantaneous reaction. To some degree one can understand such an instructor. He was trying to obtain from his students a clean flight and flawless flying technique. But can one learn to handle the aircraft correctly without ever correcting one's own errors? As a result, Matveyev completed the dual-instruction program without learning anything.

The time came for check rides with the flight commander. After firing up the engine, the student pilot received taxi clearance. He only knew theoretically how to taxi. But he took the chance. The flight commander immediately realized the situation: "Is this your first time?" And, strange as it may seem, two times up with the flight commander taught him more than the entire dual-instruction program.

Every pilot remembers every instructor he had. And the veteran can immediately name his instructors by type of aircraft. What the instructor says has a lasting echo, as is true of what the instructor does. The good instructor always sees the greater objective beyond his daily labor, an objective commensurable with the life and concerns of a generation. For the sake of this objective he is armed with patience, overcomes difficulties, and finds within himself the energy to proceed further in his own personal improvement.

Many years ago Oleg Grigor'yevich Kononenko would tell his pilots that VTOL aircraft were in the development stage. There was no sense in deluding oneself: not everything would proceed smoothly. One must remember how aviation began in general and how the jet-aircraft generation came into being. And now a new stage was being ushered in. The VTOL aircraft stood head and shoulders above preceding generations. The equipment was reliable, and the systems had been perfected. This was a new thing, however, and unknown phenomena could and most probably would be discovered in the process of operational familiarization. Experience and know-how were being amassed in order to take the next step forward, and therefore all "jump-jet" pilots should consider themselves not only combat pilots but research investigators as well. In the air, thought should proceed flight. And if the unforeseen happens, one should not immediately assume that it is irremediable. It is

essential to retain one's composure and to try to understand what is happening.

It was precisely from this point of view that Capt Ye. Matveyev acknowledged the culpability of the instructor in the hazardous incident experienced by the young pilot. How had it come about? The nose had begun to drop due to a slight shift forward in the aircraft center of gravity, which was still within the weight and balance envelope. The pilot was unprepared for such behavior by the aircraft. He had hastily pulled back on the controls and had failed to notice that he had banked the aircraft slightly. He had attempted to stop the aircraft from turning by applying rudder, but he failed to register his actions and did not make the required pause. He interpreted continuation of the turn as initiation of rotation, that is, as a sign of equipment malfunction. And he had hastily throttled back. Naturally the aircraft landed hard.

Was this an inadequate proficiency level? Probably not. The pilot was not psychologically prepared to fly a VTOL aircraft. The instructor must bear part of the blame for this.

Arguing his point of view, Capt Ye. Matveyev employed the mishap-analysis method practiced by O. Kononenko. Logically tying together the lieutenant's actions, he proved the correctness of his conclusions in a well-reasoned manner and suggested specific measures to correct the error in short order. These made it possible to intervene as needed into the young pilots' combat training process and to avoid such errors in the future.

The echo of the instructor's word.... In one's daily life, just as in one's professional training, this echo seems to respond when the situation becomes difficult and helps correctly evaluate a developing situation, which is so essential for making the correct decision.

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## CRITICAL IMPORTANCE OF LANDING PHASE STRESSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press Jun 84) p 32

[Article, published under the heading "Be Alert, In a Continuous State of Combat Readiness," by Military Pilot 1st Class Capt V. Novikov: "Landing Ahead"]

[Text] I still remember today in every little detail one of the training flights I made at the very beginning of my officer's career. I taxied out to the active and lit the afterburner. The combat aircraft swiftly surged forward into its takeoff roll and soon lifted off from the concrete.

On the tactical control frequency I was immediately given the vector heading to the intercept point. The command post officers worked with precision.

Having switched on my sight and swung right to adjust heading, I spotted the target. I closed aggressively and, locking on, fired a missile. The intercept was executed swiftly, and neither the command post officers nor I made any mistakes. The "aggressor" bomber was stopped.

I executed a 180 and headed back for the field. My heart was filled with joy. After all, the mission had been accomplished in excellent fashion!

As it turned out, however, my joy was premature. I flared high on my landing approach and overshot the landing. Naturally I received a low mark on the sortie.

The landing.... This is perhaps the most critical and difficult phase of a flight. Just like a final examination, it summarizes the level of proficiency of a pilot, who in the span of several tens of seconds must sequentially perform a great many operations.

Naturally my error was properly critiqued both in the flight and in the squadron. But the most important thing was that I myself understood its causes. In preparing for the sortie, I had devoted most of my attention to the intercept I had worked on the remainder of the sortie phases superficially, deciding that since in the past I had not received any adverse comments on my landings, this meant that I had mastered the landing procedures

sufficiently well. This complacency engendered carelessness. Following the successful intercept I considered the job practically completed and relaxed prematurely, forgetting that I had the right to relax only after shutting down the engine. And I was immediately punished.

What is the most important thing for the pilot during the landing sequence? In my opinion there are no elements of secondary importance during this sequence. Absolutely everything is important, but pilot concentration and his readiness to execute the landing are of decisive significance for successful completion of a flight.

Upon approaching the destination field, it is essential to determine fuel remaining and take into account external stores; in other words, the pilot must be precisely aware of the aircraft's landing weight. In addition, he must consider wind direction and velocity, air temperature and humidity, and barometric pressure.

The pilot, who has been taught from the very first to estimate as an aggregate the conditions in which he will be making the landing, will have a precise idea on what airspeed he must maintain on final and what the airspeed should be just prior to roundout. The combat pilot receives all these data during the preflight briefing, while some of them, refined as the flight operations shift proceeds, are radioed to the aircraft.

As a rule flight commanders direct their pilots' attention to the specific features of the sorties and execution of landings on a given day of flight operations, critique errors right at the field, and give recommendations on how to perform intelligently and efficiently in the prevailing conditions.

In working with subordinates it is very important not to permit an error which crops up in a pilot's actions to take root. If a mistake is promptly noted, it is much easier to combat it. In this regard the cockpit simulator greatly assists the flight commander in training his pilots. As we know, it forces one to operate within a rigid time limit. Therefore the trainee learns to work with precision with the cockpit equipment in pre-landing flight modes. The pilot flies the "aircraft" on the gauges practically to the middle marker, rigorously maintaining the specified parameters. In time a pilot develops stable flying skills in approach mode, and he spends less time monitoring flight parameters by scrutinizing the instruments. He can prepare himself in advance for the transition from instrument to visual flight and to the landing proper.

Practical experience convinces us that quantity of practice sessions on the simulator and in the aircraft cockpit transitions to quality and helps the pilot avoid mistakes. And this fosters confident piloting in any and all weather conditions.

Each actual dual flight in turn must be analyzed in detail, utilizing the flight recorder tapes (SOK [Objective Monitoring Means]). Unfortunately this rule is not always observed. Some instructors fail to pay adequate attention to so-called minor rough spots. As practical experience indicates, however, these minor items can become the cause of serious errors and mistakes. It is

absolutely essential for the instructor constantly to utilize flight recorder data. This helps one precisely determine prior to each training sortie where a mistake occurred during the previous flight, to analyze its causes, and to give specific advice on how to correct it.

Visual observation of pilots' actions is also very helpful to the flight commander. By carefully observing his pilots' landings from the control tower, he can gather material for a specific, meaningful discussion.

The landing also requires of the pilot a certain psychological stability. Even thoroughly rehearsed piloting technique will not help avoid mistakes if the combat pilot gets nervous and loses his composure. Needed elements here include strength and firmness of will, and confidence in the correctness of one's actions. The cockpit simulator enables the pilot to develop these attributes to a considerable degree, since with the simulator one can practice on the most difficult flight scenarios. In the process of "flying" on the simulator, the pilot learns not only to fly but also the ability to overcome doubts and indecision, and becomes accustomed to maintaining composure from takeoff to landing. This factor must also be taken into consideration.

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## IN-FLIGHT NAVIGATION ERROR ANALYZED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) p 33

[Article, published under the heading "Constant Attention to Flight Safety," by Military Navigator 1st Class Col N. Loshkarev: "The Aircraft Went Off Course"]

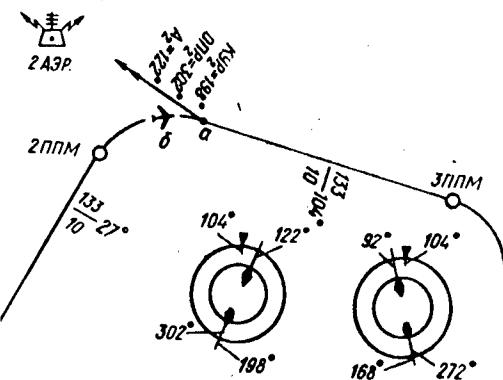
[Text] This was not Maj N. Uglanov's first cross-country flight. Upon crossing the second waypoint, he set his heading for the third. After determining the correctness of his heading, the readings of the PPD-2 and the KUR [course] pointer on the course indicator (NPP), he reported waypoint passage to ATC. He soon noticed, however, that the course indicator ZK (selected course) pointer was showing considerable movement on the current heading (TK) scale. At this time ATC alerted him that his aircraft had deviated left from his route; he was instructed to adjust his heading to the right to move back on course.

What had happened? Having become accustomed after many flights to the aircraft's navigation systems always operating properly, after passing the second PPM [waypoint] the pilot had not performed all procedures specified in the navigator's flight plan. It is evident in the accompanying diagram that after turning to a heading toward the third waypoint at point a, if the ARK [ADF] and RSBN [local radio navigation system] are working with the DPRS [long-range homing beacon] and the RSBN beacon of the second airfield, the aircraft's current heading should be 104 degrees, selected course 104 degrees, ADF and RSBN relative bearing 198 degrees, RSBN (DPRS) reciprocal (OPR) 302 degrees, and aircraft's bearing from the RSBN (DRPS) of the second airfield 122 degrees.

After turning to the proper heading for the third waypoint, the pilot should have checked the KUR pointer readings with the ARK-RSBN selector switch in the RSBN position, and then in the ARK position. If there was no significant difference, he could conclude that the SKV (flight director system), ARK and RSBN were working properly.

But the pilot, verifying the correctness of the new course and checking operation of the on-board navigation systems, failed to place the ARK-RSBN selector switch in the ARK position. As was later determined, due to careless

preparation of the navigation system on the ground, at the very beginning of the turn the course indicator current heading scale turned 30 degrees counterclockwise and subsequently turned synchronously with the aircraft's turn.



As we know, if the TK scale gives incorrect readings, the ZK and KUR pointers, indicating from the RSBN-6S, give correct readings on this scale from the selected course to the waypoint, the aircraft bearing and RSBN bearing.

During the flight in question, when the aircraft was flying the second route segment with a course of 27 degrees, the ARK-RSBN selector switch was in the RSBN position; the RSBN-6S system and the ADF were tuned to the second airfield's RSBN and DPRS; the KUR pointer indicated KUR, OPR, and the aircraft's bearing relative to the beacon. As he passed over the second waypoint, the pilot pushed the PPM-3 button-indicator light and commenced his turn.

At this moment the TK scale read a course of 57 degrees instead of 27 degrees. The ZK and KUR pointers turned together with it, remaining at correct selected course, bearing and OPR values. Subsequently the TK scale, moving synchronously with the aircraft's turn, produced an error.

At the moment when the ZK pointer was aligned with the triangular index mark or lubber line, the aircraft was close to the selected course line (LZP). From any point on this line the course to the third waypoint is 104 degrees. Therefore the selected course pointer on the current heading scale read 104 degrees. But since the pilot had aligned it to the triangular index mark as a result of his turn, the TK scale also read 104 degrees. At this moment the aircraft was approximately at the end point of the turn (position b in the diagram), and the reverse end of the KUR pointer read on the current course scale the correct aircraft bearing (122 degrees) and reciprocal bearing (302 degrees).

Thus when the ZK pointer was aligned to the triangular index mark, the TK scale, with a 30 degree error, gave a correct course reading (104 degrees).

The KUR pointer, indicating correct aircraft bearing and reciprocal on the current course scale, also pointed to a correct RSBN bearing on the outer scale, that is, visually everything was correct (the left-hand course indicator in the diagram).

The pilot, having forgotten to turn the ARK-RSBN selector switch to ARK, concluded that his heading was correct and that all systems were functioning flawlessly. If he had correctly switched the selector switch to the ARK position, the KUR pointer would immediately have shown a 168 degree relative bearing for the beacon rather than 198 degrees (the right-hand course indicator in the diagram). With this type of error by the pilot, such a problem can also occur on aircraft equipped with a PNP (planovo-navigatsionnyy pribor [planning-navigation instrument]) in place of an NPP [navigatsionno-pilotazhnnyy pribor; navigation-piloting instrument]). In the PNP, in contrast to the NPP, the KUR pointer is controlled by a sine-cosine converter (SKT), connected to a moving scale (current-heading scale). The SKT sets the opposite end of the pointer on the TK scale to the aircraft's true bearing, measured by the aircraft's RSBN equipment. With incorrect readings on the current heading scale, the KUR pointer indicates on this scale the aircraft's true bearing relative to the RSBN beacon and bearing to the RSBN beacon, while the opposite end indicates on the outer scale an incorrect RSBN beacon KUR reading.

This incident shows once again that one must thoroughly prepare a navigation sequence card for every flight, regardless of its degree of complexity, and rigorously carry out the procedures specified by the navigator's flight plan.

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## STREAMLINING BOMBER SCHEDULED INSPECTION, MAINTENANCE OPERATIONS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 34-35

[Article, published under the heading "Know-How of the Best Into the Combat Arsenal," by Gds Capt V. Sikomas, maintenance group chief: "Discipline of Maintenance Procedures"]

[Text] There is not an aircraft in the unit which in the course of the year does not pass through the hands of the specialists of our technical maintenance unit. Maintenance procedures are performed and the condition and status of the systems and assemblies are checked on each. I particularly remember a bomber with the tail number 60. Probably because the regimental deputy commander for aviation engineer service ordered us to do everything possible to ready it and turn it over to the squadron ground crewmen ahead of schedule. We would be performing hours-long maintenance procedures and replacing several equipment items which had reached scheduled replacement time. The technical maintenance unit chief, Gds Maj V. Fadeyev, reported to subunit personnel that after the aircraft was test-flown, a crew consisting primarily of young aviators would be flying a graded training sortie: a maximum-range mission with delivery of a bombing strike on a mock enemy target.

All aircraft are important as far as we technical maintenance unit specialists are concerned; we perform all scheduled maintenance procedures with a full sense of responsibility. Therefore each man endeavors to ready the equipment in such a manner that all aircraft systems and assemblies function flawlessly. But on this occasion the problem was that it was necessary to revise the timetable and make changes in the performance standards. In addition, some of our experienced maintenance specialists were on leave. Nevertheless we readied tail number 60 with excellent quality and, most important, quickly. The aircrew passed their difficult test with flying colors with this aircraft. Many technical maintenance unit specialists received commendations for their conscientious labor. It was gratifying to me, as group chief, that those cited also included my men -- experienced maintenance specialists and Air Forces master proficiency rating Gds WOs V. Petrov, I. Galkin, and V. Kozlov.

What is it that helps aviation personnel successfully accomplish their assigned tasks and honorably meet socialist pledges month after month in

competition conducted under the slogan "Be Alert, In a Continuous State of Readiness to Defend the Achievements of Socialism!"? I believe that it is first and foremost an understanding of the importance of those missions which our bomber regiment is performing, utilization of experience in mishap-free operation, firm military discipline, and maintenance procedures discipline which is inseparably linked with it. Supervisors, party and Komsomol activists are constantly concerned with strengthening orderly procedure and organization. The state of technical discipline is analyzed at technical critique and analysis sessions, work conferences and meetings, and the successes of leading performers are widely publicized in the wall press.

Gds Sr Lt N. Kozlov performs his job with enthusiasm. Demanding on himself and his subordinates, he conscientiously performs all categories of aircraft inspections within his area of specialization, and is capable of recognizing the incipient stage of development of defects from barely discernible indications. In particular, he discovered an equipment misadjustment in a prompt and timely manner. This maintenance specialist was commended by the higher-echelon commander for his competent aircraft maintenance. An operational news sheet was recently devoted to this officer. Other technical maintenance unit specialists are actively utilizing his experience and know-how.

Maintenance procedure discipline is not of an abstract but a very specific nature for our aircraft maintenance specialists. It is defined as precise adherence to maintenance operations schedules and timetables, conscientiousness in one's work, teamwork and cooperation between groups in the course of inspecting bomber equipment, and rigorous oversight by persons in authority. Practical experience has shown that if even a single maintenance technician or mechanic is guilty of unnecessary relaxation of demands, this immediately diminishes the quality of maintenance work.

On the aircraft assigned to Gds Sr Lt V. Davydov, the technical maintenance unit specialists performed maintenance procedures on schedule and with excellent quality. But the aircraft was not delivered to the squadron flight line at the prescribed time. The fact is that the subunit aviation engineer service supervisors were slow in filling out the technical documentation. Or take the following incident. Gds WO S. Nesmeyanov reported to the group chief that the landing gear had been inspected. But when the officer checked the job, he refused to pass inspection on it, since the warrant officer had not replaced a corroded screw locking device, had failed to relube, and had not touched up the paint on some parts. Nesmeyanov had to correct the deficiencies, but by this time the airframe and powerplant group mechanics were supposed to be working on the landing gear assemblies. These facts show how strictly and firmly the people in the technical maintenance units approach the slightest errors of omission and shortcomings and how resolutely they correct them.

At the present time such errors are no longer causing us problems. The group chiefs, in briefing their men, do not limit themselves merely to handing out maintenance process sequence cards and communication of the maintenance operations sequence to the executing personnel. By means of question and answer they check to determine how well the maintenance

specialists are acquainted with the methodology of readying the work station, safety procedures, and the job completion timetable. We employ in the technical maintenance unit a work-station-occupied schedule, observance of which is rigorously monitored by the expediter-controller, WO I Kotlyarevskiy. The schedule specifies the sequence of performance of maintenance procedures in those areas where there occurs convergence of the "interests" of different maintenance specialists: in the pilot and navigator spaces, in the equipment bay, in the underfloor tunnel, etc. The expediter monitors the entire process of maintenance procedures and, if congestion occurs somewhere, will immediately intervene. All this has made it possible to improve labor discipline, to increase the smoothness of the maintenance operations sequence, and to improve their quality.

The pace of execution of maintenance procedures does not diminish even if for some reason a maintenance specialist has been unable to meet the established time performance standard. On one occasion Gds WO V. Petrov, whom I had instructed to inspect a brush-commutator assembly, reported that in the course of his inspection he had spotted and corrected several problems but had not yet had time to replace the generator brushes. We could have allocated additional time to complete the operation, but we proceeded differently. In our work books Petrov and I made a note that the prescribed maintenance procedure had not been completed, and carried it over to the following day. We freed up the work station for the maintenance people of other groups, who were supposed to be replacing the generator specialist. Thus failure to keep the schedule was reflected only on the performance of one maintenance man (which is easily correctable) and did not result in an entire chain of schedule delays.

It is very important that the technicians and mechanics of the various groups not only are able to work in teamwork and cooperation but also have an understanding attitude toward the labor of their comrades. The duties of the mechanics in our group include inspection of the plug connectors of the blower fans which are located in the main-gear wheel hubs. The operation itself is not complicated, but in order to perform it the airframe and powerplant group people must remove the wheels, disassemble the brake drum, remove the fans, etc. And the panels must be removed in order to inspect the air intake heating element terminals. This requires considerable time. Whenever possible we schedule joint labor-intensive operations and seek to help one another in every way possible. Thanks to teamwork and cooperation with the group headed by experienced maintenance specialist Gds Capt V. Kolobov, for example, we have not once been forced to postpone performance of work-shift assignments.

No less close contacts were established between the personnel of other groups as well. Gunsight and bomb gear specialists, for example, led by officer Yu. Budko, and the men of officers V. Zolotukhin, M. Zaytsev, A. Popov, and others work in close teamwork and cooperation with one another during combined inspection of the aircraft control system. When necessary they assist our specialists in correcting discovered problems. This requires knowledge of aircraft construction and operating procedures not only in one's own area of specialization but also in the adjacent area.

Technical maintenance unit aviation engineer service supervisors check during questioning of the men to determine how the latter adhere to this requirement. Not settling for the specified examining sessions, the group chiefs at least once every 3 months test each maintenance specialist on the maintenance procedures sequence cards: they question them on the operation performance timetable, ask them at what stages of a job work is presented for inspection, what tools and test equipment are used in performing maintenance procedures, etc. Grades are placed in the work log based on the test results, and these grades are considered when totaling up socialist competition results. The main objective of course is not the pursuit of high marks but rather to increase technical knowledge and reinforce the skills of the maintenance specialists.

In analyzing the process of maintenance operations, we reached the conclusion that work time losses and labor expenditures can be significantly reduced if, for example, we were to adjust the sequence of replacement of items on an aircraft. The fact is that frequently it is necessary to replace a unit or assembly which has operated the prescribed number of hours on bombers delivered to the technical maintenance unit. Previously the squadron's maintenance personnel would handle this. Obtaining an equipment item at the warehouse, they would take it to the technical maintenance unit laboratories and test it. If it met specifications, it would be installed on the aircraft. The time spent on various travel back and forth, waiting one's turn for inspection, and filling in equipment records increased the time required to perform maintenance procedures.

Now these items are handled by Gds WO N. Negrebetskiy. He fills out the requisition forms and other technical documentation, obtains equipment items at the warehouse, monitors their testing on the test benches, and delivers them to the proper location. This has also facilitated the planning and scheduling of complicated technical maintenance tasks and has helped eliminate undue haste and resulting errors during performance of basic aircraft maintenance operations.

Another way to save time was found in establishing closer contacts with squadron aviation engineer service supervisors. Thanks to this, we now promptly receive information on estimated timetables for sending in aircraft for maintenance procedures, on malfunctions and defects discovered during the period between inspections. We in turn remind the maintenance specialists to prepare and fill in the required logs, forms, equipment data sheets and other technical documentation. In this connection we should like to mention our fruitful cooperation with routine servicing group chief Gds Capt V. Kireyev. He is a conscientious and demanding officer, who skillfully teaches and indoctrinates his men. We have not had a single misunderstanding during aircraft delivery and acceptance.

We immediately record in the malfunction analysis log information obtained from the squadron. The group chiefs prepare comparative reports, which helps improve preventive maintenance and facilitates the search for faults. Analysis results are always communicated to each maintenance technician and mechanic at weekly technical analysis sessions. We also make an effort effectively to utilize obtained information during aircraft disassembly, when

all maintenance and servicing covers are unbuttoned. For the young aviation personnel this is a learning session during which they reinforce their knowledge on the design, construction, and placement of equipment and lines and perfect their equipment servicing and maintenance skills. Frequently such discussions lead to interesting technical solutions, which also helps strengthen maintenance procedures discipline.

Officer-innovators V. Vorob'yev and V. Ponomarev, for example, suggested improving the method of inspecting and checking the aircraft control system. Previously hours were spent on this operation. The mechanic would work at a location unprotected from wind and rain, and he required time to get warm. Technical maintenance unit technicians reequipped an obsolete mobile laboratory housed in a ZIL-137 truck, replaced and improved panels and consoles, and installed extension cable harnesses, which can be plugged into the bomber. Thanks to this, the group technician or mechanic, stationed in the laboratory van, can test and check equipment quickly and with excellent quality. With the aid of this laboratory we have facilitated inspection of the condition of the aircraft air intake control systems. Sets of replacement units are carried on the truck. If a problem is discovered, the inspecting specialist can easily and quickly replace the equipment item.

Officer V. Mikhaylov fashioned a small device to test low-power electrical equipment. This made it possible to free up two to three maintenance specialists who formerly had checked and inspected the condition of numerous electrically-operated hydraulic valves and electrical devices.

Ingenious ideas devised by our innovators are extensively utilized in other subunits. They save time and reduce labor outlays, and they increase the technical competence of the maintenance specialists and improve the quality of performance of inspection and maintenance.

It is true that not all problems have been resolved in the campaign to strengthen production discipline and incorporate scientific organization of labor. Some maintenance specialists still are not serving as a model of high efficiency in the process of performing inspection and maintenance procedures. We are also hindered by objective factors. In particular, the groups lack standards logs for recording parameters and malfunctions. Preparing such aids with their own resources takes up much time.

On the whole, however, things are going well in the technical maintenance unit. For a number of years now our outfit has maintained a rating of excellent. More than 80 percent of the technicians and mechanics are master proficiency-rated and specialists first class. Communists and Komsomol members display a personal example in performance of their duties. They consider as the real rating of their labor not the mark they receive upon turning an aircraft back to the squadron but the mark given after the aircraft is flight-tested. As a result the men feel a greater sense of responsibility for the end result of their work. And this is an important factor in the

campaign to strengthen military and job discipline and to achieve high quality of aircraft inspection and maintenance activities.

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ENGINEERS STUDY ADVERSE EFFECTS OF FULL-THROTTLE, AFTERBURNER ENGINE OPERATION

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 36-37

[Article, published under the heading "Know-How of the Best Into the Combat Arsenal," by Maj Gen Avn Yu. Voytsekhovskiy and Lt Col G. Gayevskiy: "Engine Operation in the Air"]

[Text] The operational reliability of a modern aircraft powerplant depends in large measure on correct observance by the aircrew of temperature conditions which are different at each stage of a flight. We know that engine components are subjected to the greatest stresses at full throttle and during afterburner operation. It is operating in maximum output in these modes. It is therefore very important for the pilot constantly to take into consideration all the specific features connected with powerplant operation. This determines in large measure engine life, fuel economy, as well as aircraft equipment reliability.

In recent years a great deal of attention has been devoted to this matter in Air Forces units and subunits. First of all, ground maintenance specialists make extensive use of records by various flight parameters recording devices. Engineers analyze engine operating time in full-throttle and afterburner-on modes in the process of performance of various flying maneuvers by aircrews. They also consider quantity of expended fuel, number of times afterburners are lit and full throttle is employed during flight, which leads to an rpm change of more than 10 percent in a span of 4-5 seconds.

A number of units have amassed a certain amount of experience in selecting and studying materials which make it possible to evaluate the correctness of utilization by aircrews of high-temperature engine operating modes in the air. A certain methodology has been formulated on the basis of mathematical statistical data. In determining a criterion, specialists usually select not fewer than 40-50 sorties employing a specific maneuver executed by different pilots. The coefficient of utilization by aircrews of high-temperature engine operating conditions (Khtc) serves as this criterion:

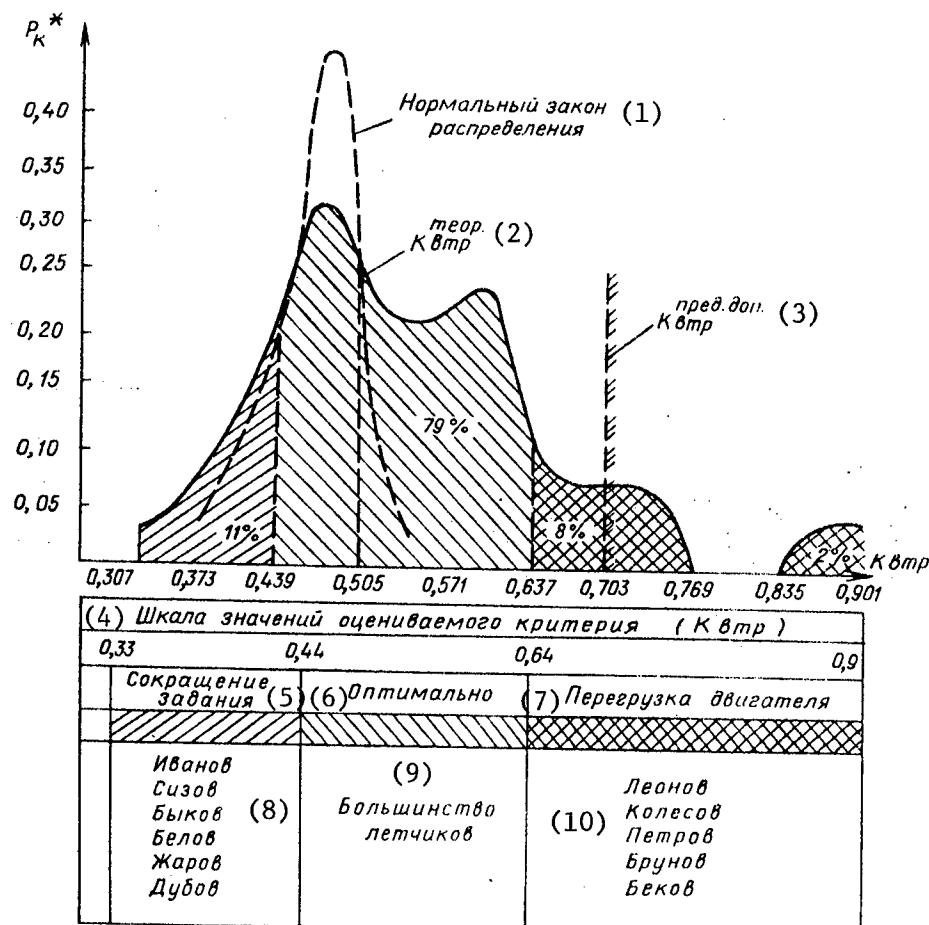
$$Khtc = \frac{tm+ta}{\frac{1}{n} \sum_{i=1}^n t_i}$$

where  $t_m$  -- engine operating time at "maximum" (in minutes);  $t_a$  -- engine operating time in "afterburner" mode (in minutes);

$\frac{1}{n} \sum_{i=1}^n t_i$  -- arithmetical mean time of execution of flight assignment for all  $n$  flights (in minutes);

$n$  -- number of flights involving given maneuver;  $t_i$  -- time of execution of given maneuver (in minutes).

For purposes of analysis, one plots a distribution curve of the selected criterion, for which engineers employ a special table.



Key: 1. Normal distribution; 2. Theoretical Khtc; 3. Proposed additional Khtc; 4. Scale of values of estimated criterion (Khtc); 5. Shortening of mission task; 6. Optimal; 7. Engine overload; 8. Ivanov, Sizov, Bykov, Belov, Zharov, Dubov; 9. Majority of pilots; 10. Leonov, Kolesov, Petrov, Brunov, Bekov

Let us examine a specific example. Let us say that we must evaluate utilization of engine high-temperature operation conditions by pilots during a training flight in the practice area to practice advanced maneuvers. In this example we employed the flight recorder tapes for 53 training sorties, and the appraisal is made on the basis of the following criterion:

$$Khtc = \frac{tm+ta}{\frac{1}{n} \sum_{i=1}^n t_i}$$

The values of coefficient  $Khtc$ , obtained by the pilots on these flights, are broken down into nine categories (of uniform intervals). The boundaries of each category are placed in a special table. The  $Khtc$  value is determined for each category as an arithmetical mean. We then calculate the number of flights corresponding in  $Khtc$  value to a given category ( $m_i$ ). The engineers enter these data into the table. As a result they determine statistical frequency (probability of falling within a given category)  $Pk^*$ :

$$Pk^* = m_i / n,$$

where  $m_i$  -- number of flights with  $Khtc$  values corresponding to  $i$  category;  $n$  -- number of flights selected for evaluation (in our example -- 53). Distribution density (distribution curve) in coordinates is indicated on the curve from the figures in the table:  $Pk^* = f(Khtc)$ .

(1) Значения параметров		(2) разряды								
		1	2	3	4	5	6	7	8	9
(3) Границы разрядов	$K_i$ $K_{i+1}$	0,307 0,373	0,373 0,439	0,439 0,505	0,505 0,571	0,571 0,637	0,637 0,703	0,703 0,769	0,769 0,835	0,835 0,901
Среднее значение параметра для разряда (4)	$K_{icp}$	0,034	0,406	0,472	0,538	0,604	0,670	0,736	0,802	0,868
Число реализаций (полетов) в каждом разряде (5)	$m_i$	2	4	17	12	13	2	2	—	1
(6) Статистическая частота	$Pk^*$	0,038	0,075	0,32	0,226	0,245	0,038	0,038	—	0,019

Key: 1. Values of parameters; 2. Categories; 3. Boundaries of categories; 4. Mean parameter value for categories; 5. Number of realizations (flights) in each category; 6. Statistical frequency

The points in the curve are placed according to the mean value of criterion  $Khtc$  and mean statistical frequency  $Pk^*$  for each of the nine categories. The diagram shows the appearance of the distribution curve.

The obtained curve is analyzed. It is used to determine the  $Khtc$  value at which the maneuver was performed by the maximum number of pilots ( $Khtc$ )<sub>opt</sub>, as well as the range of admissible deviations plus over minus Delta  $Khtc$  left and

right from  $(K_{htc})_{opt}$ . Then they find the maximum value of  $K_{htc}$  for the left branch of the curve to the left boundary of the range of allowable deviations from  $(K_{htc})_{opt}$ , the  $K_{htc}$  value for the right branch of the curve, from the right boundary of the range to its maximum value. The range of deviations of  $K_{htc}$  from  $(K_{htc})_{opt}$  to the right and left by a specified magnitude is considered optimal.

$K_{htc}$  values for the left branch of the curve with  $K_{htc}=0.439$  correspond to performance of air maneuvers on a reduced program, and  $K_{htc}$  values for the right branch of the curve with  $K_{htc}=0.637$  -- performance of the maneuver with elevated temperature load on the engine.

Utilizing the flight execution diagram for a given maneuver sequence, our engineers determined the theoretical value of  $K_{htc}$  and placed it on the diagram. From an analysis of other maneuver sequences, as well as training sorties by pilots of different units on the same maneuver sequences, and study of powerplant performance characteristics, operating manuals and crew instructions, they determined the maximum allowable  $K_{htc}$  value and also placed these data on the diagram.

The diagram obtained in this manner enabled the engineers to analyze pilot utilization of engine high-temperature operating conditions and maneuver sequence execution methodology.

With performance of other similar flight assignments by all high proficiency-rating pilots, the shape of the curve will correspond to normal distribution with those characteristics which are in conformity with it: mathematical expectation

$$\tilde{m}_x = \frac{1}{n} \sum_{i=1}^n K_i$$

and standard deviation

$$\sigma_x = \pm \sqrt{\frac{1}{n-1} (\tilde{m}_x - K_i)^2}$$

We should note that frequently the distribution curve for a line unit cannot correspond to a given standard principle. Even this curve, however, enables one to analyze execution of a training sortie and pilot utilization of engine high-temperature operating conditions, since it always has a clearly-marked maximum.

Flights during which  $K_{htc}$  values are above maximal or differ substantially in the direction of increase from  $(K_{htc})_{opt}$  or  $(K_{htc})_{theor}$  are thoroughly analyzed on the basis of flight recorder tapes. An engine with which a pilot has exceeded maximum output ( $K_{htc}$ ) during a training sortie is subjected to thorough inspection with the aid of standard test equipment for the purpose of determining adverse consequences from the excessive temperature load.

This methodology has won the approval of flight and engineer-technician personnel and is being adopted into the practical operations of Air Forces units of the Red-Banner Transcaucasus Military District.

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## SOVIET HELICOPTER CREWS FLY MISSIONS OF MERCY IN AFGHANISTAN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 38-39

[Article, published under the heading "Into Competition," by Maj V. Usol'tsev: "Testing One's Mettle"]

[Text] "Captain, Watch Out! To the right...."

Hearing in his headset the anxious voice of Capt L. Galushko, Maj V. Romanov sideslipped the helicopter into a turn. In the many hours spent in the skies over Afghanistan, they had learned to understand one another with a single word. The helicopter darted into a gorge, on the floor of which a mountain stream was barely distinguishable through the bluish haze.

As he descended, the helicopter pilot discerned with his peripheral vision human figures outlined against the green background of the mountain, plus muzzle flashes. And he heard bullets striking the side of the helicopter. "They managed to hit us after all," the pilot thought unhappily.

Sheer cliffs now shielded the pair of Soviet helicopters from the dushman [bandits, rebels]. Gingerly testing the controls, Romanov sought to determine if they were working properly. The helicopter responded to cyclic, collective, and foot pedals. Instrument readings were also normal. "We're alright," Vladimir said to himself, relieved, and ordered flight technician Sr Lt V. Orichak to check the cargo space.

"How are you doing, 11?" Romanov queried his wingman a moment later.

"No problem, 10. We didn't take any hits," responded Capt V. Kondrashov. "We are proceeding in echelon left."

The major went off the air. His men were conducting themselves well, calm and composed.

Military Pilot 1st Class Maj Vladimir Romanov, commander of an excellent-rated section[/flight], knew each of his men well. Their professional skill had been tested time and again in the most difficult situations. During a recent exercise, for example, the helicopter crews had been assigned the mission to

"destroy" a mock "aggressor" base and support the advance of a ground subunit. The base was defended by a formidable air defense system. It seemed that the helicopters had a negligible chance of breaking through and knocking it out with a rocket strike. They stood a strong chance of ending up "downed" by heavy ground fire. But there is no such thing as an absolutely impossible mission. The squadron commander instructed Maj V. Romanov to carry out the mission assigned by the exercise director. His section's pilots were the most highly trained and prepared in a tactical and moral-psychological respect.

...Vladimir had not dreamed of becoming a military pilot. He was born in a city of chemical workers -- Chapayevsk, in Kuybyshev Oblast. After completing school he was planning to get a job at the plant where his parents worked and to carry on the family tradition. He completed studies at a secondary technical school which trained chemical industry specialists. Perhaps Vladimir would today be working at the plant if he had not once seen helicopters close up and became acquainted with pilots. He was won over by the people who flew these remarkable rotary-wing aircraft. This is what determined the future direction of his career. He enrolled as a cadet at the Syzran Higher Military Aviation School for Pilots.

From his very first day at school he decided that if he was going to be a pilot, he must become an expert at his job. And he proceeded toward this goal with persistence. He worked hard to increase his professional knowledge. And subsequently, even after becoming a first-class combat pilot, he endeavored to learn as many secrets of the military profession as possible, and he worked persistently to pass on his knowledge and know-how to his men. It is not surprising that for a number of years now his section has been considered one of the finest. Naturally it is assigned the most difficult mock combat missions.

...When going up against a modern air defense system, one can count on success only with the element of offensive surprise. But how could they gain the element of surprise? Romanov carefully studied the target area on the map. His attention was drawn by a gorge which ran quite close to the "aggressor" base. He mapped out a plan of action.

"We shall approach the objective along the bottom of the gorge," the major briefed his men. "Then on command we climb steeply. Bear in mind that you will only have a few seconds to aim and fire your rockets. Then we drop back down into the gorge and return to base."

The squadron commander approved the section commander's plan of action. He agreed that the element of surprise would help the helicopter crews gain victory in the difficult engagement with the "aggressor."

The helicopter crews succeeded in approaching the target undetected. The "adversary" was unable to organize countermeasures in the few seconds which the helicopters spent above the battlefield. Romanov and his wingmen had enough time to deliver a devastating rocket attack. Now nothing hindered the motorized riflemen's successful advance.

Of course success was ensured first and foremost by the commander's daily individual work with his men. Whenever he noted any roughness in a pilot's flying technique or a gap in his knowledge, he would immediately take steps to correct the deficiencies and apply maximum effort to eliminate them.

The skies over Afghanistan tested Vladimir's mettle time and again. But party member Romanov and his winged comrades successfully accomplished the most difficult air missions.

The flight technician entered the cockpit.

"No problem, captain," he reported. "The dushman put holes through a few sacks of flour, and the cargo space is now a bit drafty. But that is no problem. We can patch the holes when we get back. This isn't the first time."

Indeed, the dushman had time and again fired at helicopters carrying food supplies and fuel to the people of mountain kishlaks [villages] which were cut off from the towns by avalanches and snowfalls or by bands of cutthroats. And on each occasion the ground maintenance people quickly patched the holes and readied the helicopters to go out again.

Major Romanov frequently pondered the motives which compelled these comrades to risk their own lives to aid the Afghan people. And he found an answer in the internationalism, sympathy with another's grief, and a desire to help people when they are having difficult times, traits which are characteristic of our people. Is that not the reason why in the last century Russia came to the aid of the Bulgarian people, who were suffering under the yoke of Turkish oppression? Was it not these sentiments which compelled Soviet internationalist-volunteers to defend Republican Spain in the 1930's? History contains many such examples! And now Afghanistan. Evidently each generation has its own heroic milestones.

Vladimir Petrovich had also noticed something else: the more difficult a mission, the more volunteers there were to carry it out. Once, when it became necessary to come to the aid of an Afghan subunit which had become trapped in a mountain rockslide, the entire squadron stepped forward. But the squadron commander chose Romanov's section. He already had experience in flying such missions. When the helicopters reached the subunit's position, they discovered that there was no suitable landing site in the area. But the soldiers below, exhausted by days of marching, sleepless nights and cold, and clashes with the dushman, were unable to clamber over the mountains. They had sick and wounded. Romanov selected a comparatively flat site, where a single helicopter could set down its nose gear.

"Watch me closely," he radioed his wingmen. "As you are reaching the ground, keep your collective up."

And he proceeded to land. Skillfully holding the helicopter in position, he took a number of Afghan soldiers on board.

Grasping the commander's plan of action, the other crews also performed flawlessly. They later learned that the Soviet helicopter crews' prompt assistance saved the lives of many Afghan soldiers.

..."Captain, we are approaching our destination. The kishlak lies just beyond that bend in the gorge," the pilot-navigator reported over the intercom.

He was right. The gorge opened up into a small valley, which sheltered several dozen mud huts. They were waiting for the helicopters carrying food supplies: women, children, and oldsters, wearing native costumes, waved in greeting. The skilled pilots had no problem putting down onto a flat meadow.

The life of every military man is rich in events. But events are particularly abundant in the military experience of military pilot party member Maj Vladimir Petrovich Romanov. He has been awarded the Order of the Red Star for courage and valor displayed in the performance of flight assignments and for a high degree of professional skill.

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## MANEUVER PECULIARITIES OF COAXIAL HELICOPTERS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 42-43

[Article, published under the heading "Practical Aerodynamics for the Pilot," by Honored Test Pilot USSR N. Bezdetnov: "Maneuvering With a Coaxial Helicopter"]

[Text] Soviet coaxial helicopters possess many virtues. One particularly important advantage is the independence of directions of acceleration from hovering mode and deceleration to hovering from wind direction and velocity. Nevertheless pilots must take into account the peculiarities inherent in these flight modes.

We shall analyze the essential nature of operating restrictions regarding wind force at various wind angles in hovering mode.

With an increase in crosswind by approximately 25 percent above the allowable force specified in the manual, the pilot applies full pedal with sufficiently large control reserve. If the wind continues to pick up, the helicopter independently turns to an angle corresponding to the maximum crosswind component (magnitude at which the pedal, holding the initial hover heading, is fully applied). In other words, the helicopter itself adjusts the angle of turn with the wind, determined by wind force. No phenomena occur which involve diminished flight safety. In the absence of one-sided directional controllability (it is always present in the direction of the wind), the helicopter automatically trims relative to the Y axis. Thus a coaxial helicopter is not concerned by crosswind.

A substantial increase in wind force from the direction of the tail as a rule results in the nose dropping. If the wind force exceeds by approximately 25 percent the allowable force specified in the manual, the cyclic stick is pulled full back. After this the nose begins dropping rapidly. In this case the rate of acceleration is considerably less, and therefore the most effective way to correct the situation is immediately to apply full pedal in the direction of the turn in progress, or left pedal if no turn has been initiated. The helicopter turns vigorously into the wind, the cyclic stick comes forward, and with a turn of approximately 30 degrees it becomes readily controllable longitudinally.

Such a situation is little probable, since in hovering mode in no-wind conditions, into or with a wind of allowable velocity, the pilot commences picking up speed rearward (toward the tail). The slightest deviation from the selected heading leads to a slip, and the helicopter spontaneously swings its nose into the oncoming airstream. As we see, there is no hazard, but nevertheless, in order to eliminate the possibility of ending up in an unusual situation, the operating manual specifies maximum allowable force of rearward airstream. The maneuver capability of coaxial helicopters capable of hovering in no-wind conditions out of ground effect is shown in the diagrams, where:  $U$  -- wind vector,  $W$  -- vector of helicopter motion relative to the ground,  $W'$  -- vector of oncoming airstream from helicopter movement relative to the ground,  $V'$  -- sum vector of oncoming airstream ( $V'=U+W'$ ), 1, 2, 3... -- sequential positions of helicopter in transition process.

Figure 1 portrays acceleration left or right from hover into a wind of any magnitude. The possibility of acceleration of ground speed  $W$  strictly in the selected direction laterally and without slip is obvious.

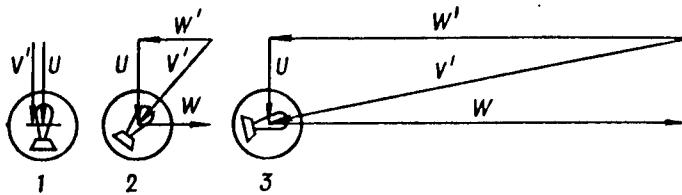


Figure 1. Acceleration sideward -- to the right.

Figure 2 shows acceleration from hover into the wind sideward and rearward. Here too one can clearly see the possibility of maintaining direction of acceleration without slip.

Figure 3 shows rearward acceleration into the wind from hovering. Initially the air stream ( $V'=U$ ) flowing past the helicopter during hovering diminishes to zero, and then increases to the magnitude selected by the pilot. At the moment the force of flow passes zero ( $W'=U'$ ), the helicopter is in relatively no-wind conditions. This zone of shift in direction of airflow enables the pilot to turn the aircraft's nose 180 degrees at the highest rate of acceleration, without exceeding any operating restrictions.

Analysis also shows that the helicopter is capable of deceleration right down to hover, regardless of meteorological wind direction and force (Figure 4).

If we analyze the required power and ground speed  $W$  curves for various directions of coaxial helicopter acceleration at various wind velocities, we can see that in all instances required power is not greater than during acceleration from hovering in no-wind conditions. The pilot perceives its characteristic change at the commencement of acceleration rearward or at the

end of deceleration with a tailwind as a brief-duration downward flow or slight air turbulence. It is easily countered with collective pitch.

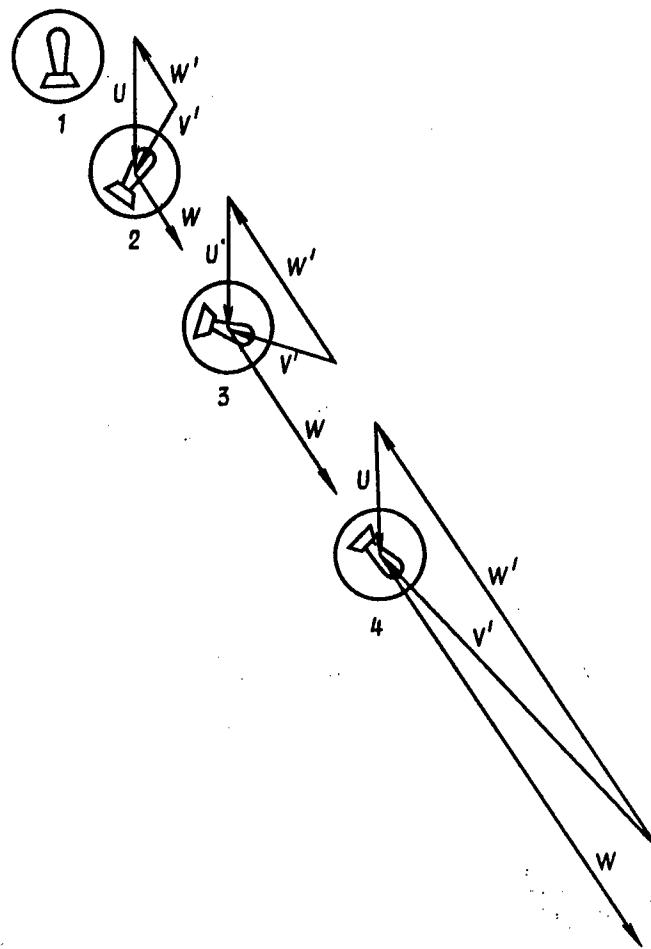


Figure 2. Acceleration sideward-rearward-to the right.

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In the process of learning to fly coaxial helicopters, not all pilots are immediately able to sense the relative current airflow direction  $V'$  and to orient the helicopter's nose into it in time. Therefore we would do well to examine responses in case of gross errors during accelerations and decelerations.

Let us assume that having commenced sideward acceleration, the pilot, failing to sense a change in airflow, has left the pedals in neutral position. The aircraft immediately begins to slip, begins spontaneously to weathervane and sluggishly to take a heading approximately equal to the direction of acceleration.

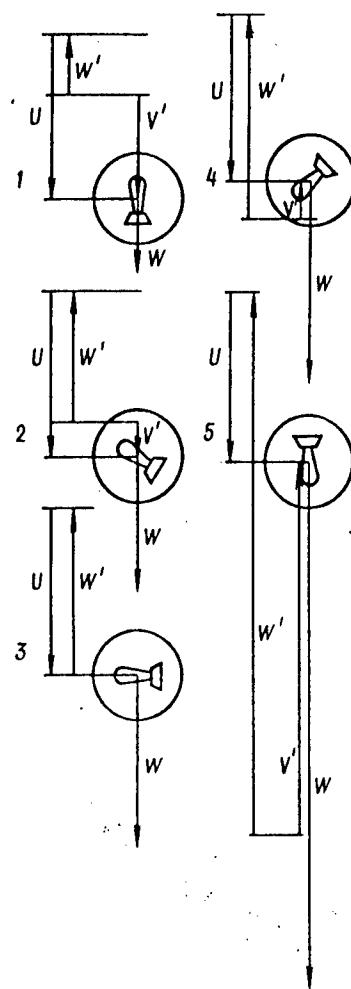


Figure 3. Acceleration rearward.

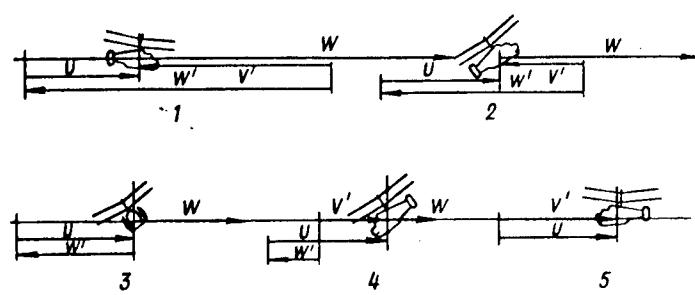


Figure 4. Deceleration with tailwind.

If the pilot, having commenced sideward acceleration, prevents the helicopter from turning spontaneously by applying opposite pedal, the slip will increase until lateral airflow component  $V'$  increases to approximately one and one fourth allowable crosswind while hovering. The pedal opposing swing will be fully depressed, and the helicopter will spontaneously turn in the direction of acceleration, but with much greater slip than with neutral pedals. With an increase in airflow force  $V'$ , the slip angle will decrease with the lateral airflow component unchanged.

Let us examine a case where, during rearward acceleration from hovering, against a strong wind (in excess of maximum crosswind value), the pilot immediately applies full pedal to turn 180 degrees and holds in that position. Since the rate of acceleration is less than the rate of turn, the helicopter will initially turn to a slip angle corresponding to maximum airflow component  $V'$ . As it decreases, the angle will increase to 90 degrees, and only after this will the pedal, overcoming the moment from component  $V'$ , which at this time is less than maximum, help turn the helicopter's nose into the direction of acceleration.

During rearward acceleration, the pilot continuously maintains neutral pedals. After the effect of airflow  $V'$  into the helicopter's nose diminishes to zero, it begins to increase into the tail. At this time the helicopter becomes extremely directionally unstable and, if it is not held by the pedals, will spontaneously turn 180 degrees (toward the increasing airflow). A turn with neutral pedals is brisk, but safe.

During acceleration rearward the pilot continuously maintains the initial heading with his foot pedals. This is fairly complicated from the moment of increase in force of airflow  $V'$  into the tail, since it is essential promptly and vigorously to counter with the pedals the helicopter's tendency spontaneously to turn 180 degrees. Otherwise the moment of instability increases rapidly and becomes greater than the controlling moment with fully-depressed pedal. If the pilot succeeds in maintaining heading, with an increase in airflow  $V'$  into the tail to a magnitude approximately one fourth greater than the maximum allowable, the helicopter will commence to drop its nose vigorously. This situation also applies to deceleration, which can take place in any direction.

Experience and analysis of pilot actions indicate that the excellent maneuver capabilities and simplicity of flying coaxial helicopters make it possible to operate them in virtually any wind conditions.

During acceleration sideward into the wind, a relatively accelerated helicopter movement should begin by moving the cyclic stick strictly in the selected direction. At the very outset the pedal is depressed slightly (one fourth full travel), and an attempt is made to turn the aircraft nose in the direction of acceleration. As ground speed increases, it becomes increasingly easier to turn the helicopter. The pilot uses the foot pedals to stop the turn at the acceleration heading, taking drift into account. The aircraft subsequently accelerates up to the desired speed.

Of course in all cases it is necessary to orient control movements with the selected direction of change in ground speed. In other words, when changing the helicopter's heading, control movements are maintained within a terrestrial coordinate system. This can be accomplished by pilots of every level of skill.

Sideward-rearward acceleration differs virtually in no way from sideward acceleration. During acceleration more rearward than sideward, and in a strong meteorological wind, after commencement of yawing motion the pilot should depress the pedal to turn from the moment indicated airspeed decreases to an unsteady reading (20 km/h, 5 m/s).

During rearward acceleration, after indicated airspeed drops until an unsteady reading develops, the pilot must give left half pedal and stop the helicopter's turn on acceleration heading.

Deceleration with crosswind-tailwind component to hovering into the wind does not present any difficulty. Even if the pedals are left neutral in the process of deceleration, the helicopter itself will turn into the wind just prior to hovering.

With a tailwind it is desirable to initiate deceleration sooner than in the other cases, since here distance covered during deceleration will be added. After indicated airspeed drops to 40 km/h, the pilot should give one quarter left pedal (if IAS has dropped to an unsteady reading -- left half pedal). The turn should be stopped by the pedals on a heading opposite to deceleration. The pilot should continue decelerating tail forward until hovering.

If wind direction and velocity are not known, at 40 km/h the pilot should give one sixth left pedal (in order to avoid commencement of hovering and hovering with excessive wind velocity from the tail) and continue deceleration. In no-wind conditions the helicopter will begin slowly turning to the left immediately prior to and during hovering. With a headwind the helicopter will commence hovering with a slight (10-15 degrees) turn to the left. If the wind is from the right, just prior to hovering the aircraft will turn to the right and initiate hover with the same turn to the left. With a tailwind, the helicopter will execute a timely 180 degree left turn, and hovering will occur with a 10-15 degree turn left from the wind. If the wind is from the left, the turn in this direction will be somewhat more vigorous. In this case the pilot should leave the pedals neutral, and the helicopter will hover into the wind.

Success in solving certain specific problems depends to a great degree on maneuvering skill. A coaxial helicopter is capable of executing maneuver from acceleration to hovering at a new point strictly along a straight line, regardless of force and direction of meteorological wind, in minimal time.

The pilot who has well mastered all the capabilities of a helicopter is always master of the situation and accomplishes missions in excellent fashion in the most difficult situation.

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## NAVAL AVIATION REGIMENTAL COMMANDER PRAISED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) p 44

[Article, published under the heading "Visiting Comrades in Arms," by Capt 3rd Rank S. Turchenko: "Commander Heights"]

[Text] Last year the guards aviation regiment of naval combat aircraft under the command of Gds Col V. Cherednichenko was named best in the Northern Fleet. But the guardsmen refused to rest on their laurels and are today accomplishing their assigned missions with equal success. Higher-echelon commanders maintain that a good deal of the credit for this must go to the commanding officer, a veteran pilot and indoctrinator.

What is the main element in his work? One cannot give an immediate answer. Guideline documents specify a great many duties for a commanding officer. And all of them are of principal importance. Flight operations, training, party-political work, military indoctrination, administrative activities, and many others. But what is the most important item? Valeriy Dem'yanovich Cherednichenko believes that the most important thing is to work together with political workers, party and Komsomol activists on continuously unifying the collective, so that it is strong, reliable, combat-efficient, and on this foundation to maintain combat readiness at the very highest level.

It is not difficult to imagine how hard it is in the whirl of daily activities, taking care of the thousand things one has to do, and sometimes overcoming sluggishness as well, which in some measure characterizes certain individuals in a large military outfit, not to lessen the attention of one's subordinates toward the main task, that which is of primary importance. Valeriy Dem'yanovich has this ability. Here are some brush strokes to the portrait of Gds Col V. Cherednichenko.

...A flight operations schedule was being prepared. Staff officers and squadron commanders were reporting their thoughts to the regimental commander: since the mission was a difficult one, and the young aviators would not have enough time to practice the maneuvers, the experienced pilots would go up. The commanding officer, listening carefully to what his officers had to say, examined the schedule, appraised the situation, and amended the schedule.

Flights by those pilots who still needed to gain experience and skill were included in the alternate variations of the flight operations schedule. The command and staff edifice was refocused on those tasks which were of primary importance for today.

Everything goes smoothly and simply only on paper, however. In actuality implementation of one's line of policy requires purposefulness, persistence, with a great deal of aggravation and expenditure of energy, plus integrity, frankness, and firmness.

Let us say, for example, that higher headquarters, in connection with deteriorating weather, recommends cancellation or postponement of scheduled training sorties. The weather does permit, however, working on certain tasks within the framework of the requirements of guideline documents. Conditions may permit, but how many commanders will argue to the higher echelon that it has not taken everything into consideration? Cherednichenko, after analyzing conditions in detail, stoutly argues his position in a well-reasoned manner if he believes that this will benefit the cause. Sometimes he is reproached: why make things more difficult for you and others? But if one adheres to the principle of personal comfort and tranquillity, one can hardly achieve a high degree of outfit preparedness to carry out combat missions in any and all conditions.

...The squadron was preparing for a tactical air exercise. They would be delivering a missile strike on a mock adversary. This was quite sufficient to appraise the crews' level of proficiency. But the regimental commander had made the situation considerably more complicated. Some of the staff officers, being exceedingly cautious, proceeded to urge him not to do so: what if suddenly some chance occurrence affects the grade?

"We do not fly for the purpose of being graded; we are preparing for actual combat," Cherednichenko stated at the time.

The squadron's personnel accomplished the mission with a mark of excellent. But the main thing was the fact that the crews gained skills in operating in conditions maximally approaching actual combat, and the staff officers learned a lesson of commander boldness and civic courage.

Guards Colonel Cherednichenko's men can learn a great deal from their commanding officer. Determination, purposefulness, a high degree of professionalism, outstanding commander knowledgeability -- these and many other qualities have gained him respect and authority.

"When the regimental commander is running flight operations, we pack three days work into a single day," the pilots joke, and then add in seriousness: "Because every minute in the air becomes 3 times as instructive."

And this is indeed so. There is good reason for the fact that the level of professional skill of aviation personnel in this regiment has risen steadily in recent years. People pull themselves up and grow in stature under the guidance of such a commanding officer, and not only because he has the ability to teach and the system of pilot training practiced in this unit is focused

toward the upper limit of complexity, but also because an atmosphere of businesslike benevolence and mutual respect has been created in the outfit.

It is the commander's sacred obligation to know his men and to be able to influence them in a timely manner. But little benefit is generated from personal contact based on obligation alone. Colonel Cherednichenko likes people and tries to understand them. He knows the first names and patronymics of all the members of the aircrews, their background histories, as well as their flying skills. He takes a lively interest in the aviators' activities both on and off duty. If necessary, he comes to their aid.

"Recently our squadron was readying for flight operations," related a detachment commander. "Colonel Cherednichenko walked into the classroom. The squadron commander barked: 'Comrade officers!' We stood up. After greeting us, the commanding officer walked up to my navigator and wished him happy birthday. He inquired how things were going with his family. I was hearing for the first time the things they were talking about. Quite frankly, I was ashamed that I did not know my men as well as I should...."

Valeriy Dem'yanovich teaches through personal example. A healthy moral climate prevails in the regiment, which enables the men to overcome any and all difficulties and to achieve high performance levels in combat training.

The commanding officer of an aviation regiment has many duties. And they do not include any of secondary importance. He must devote the closest attention to every one of them. But one duty is perhaps the most important, without which one can hardly be a genuine aviation commander: the duty to fly. The pilot's heart and soul are revealed in performance of this duty.

Here is what one of the aircraft commanders said: "Once the regimental commander flew out with a detachment on a training sortie. The mission was to reach the objective area undetected and attack the target. Several of the crews were detected by the antiair assets of the surface ships which were playing the 'aggressor.' But the aircraft flown by Valeriy Dem'yanovich proved to be invisible and invulnerable. The regimental commander skillfully maneuvered and accomplished the mission in excellent fashion, showing the pilots a model of flying and tactical skills."

Valeriy Dem'yanovich has very special feelings about the flying profession. He compares his job with that of a painter, who dedicates his entire life to art. Without flying, he maintains, a pilot is sick. The heavens call him unrelentingly.

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## LYAKHOV DESCRIBES SOYUZ T-9 MISSION

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 84 (signed to press 1 Jun 84) pp 45-46

[Article, published under the heading "Reminiscences of a Space Mission," by twice Hero of the Soviet Union Pilot-Cosmonaut USSR Col V. Lyakhov: "One Hundred and Fifty Days in Orbit"; second of two parts, first part appeared in June issue; taken down by I. Yudin]

[Text] We have been in orbit more than a month now. Work is moving right along. Difficult, interesting work, one's favorite job is a guarantee of happiness. I have always said that I am a fortunate person. I dreamed of becoming a pilot, and I became one, subsequently a test pilot and, finally, a pilot-cosmonaut. Aleksandr agrees with me: "When you devote yourself to a cause, when you benefit people, then happiness comes to you."

My flight engineer is outstanding. We have not been working together for very long, but we make a good team. Sasha is a calm, kind, sober-minded individual. He has had a great deal of experience working with space hardware. He possesses excellent knowledge of it.

\* \* \*

A great many technical experiments have now been performed in space. We have produced all kinds of alloys, crystals, and semiconductors. Earth orbit offers favorable conditions for this: substances with different densities and in different states mix together. Not as uniformly as one might wish, it is true.

As early as 1976 B. Volynov and V. Zholobov observed gas bubbles breaking up in weightlessness. Subsequently the Pion unit was designed and built. With this apparatus V. Kovalenok and V. Savinykh evaluated the behavior of melts. Scientists determined that in a state of weightlessness temperature zone interfaces become a center of attraction. In addition, it is not such a simple matter to obtain ideal weightlessness in earth orbit, for the earth is not a sphere, and an orbit is not circular.

We have an improved Pion. With it we can quantitatively evaluate processes taking place in multiphase media and observe their dynamics. A motion-picture camera mounted in the device records on film everything which takes place in

the transparent cuvettes. At the request of the specialists we are also conducting observations with the naked eye.

The oceanographers once complained: "Fellows, you owe the ocean! You have done enough for other fields to last them 5 years, but you have forgotten about us...."

We had not forgotten -- we were diverted by other matters. We are now proceeding with a study of the currents and gyres of the Atlantic and Pacific....

Up until recently it was believed that scattering of light by the atmosphere creates an impenetrable screen preventing observation from space of processes taking place on the surface of the ocean, not to mention within the ocean. Excellent photographs of active regions of the ocean have been obtained from orbit, however. It has become clear that study of the ocean in the visible region of the spectrum is entirely possible. But this did not mean that one can disregard the influence of the atmosphere. Aerosols, water vapor and gases, which change their composition with altitude in a complex fashion, have a substantial effect on accuracy of measurements. Even in the absence of cloud cover, atmospheric haze frequently impedes visual observation and photography.

But cannot this obstacle be surmounted with the aid of spectral equipment and special computer processing of imagery? The Interkosmos-Black Sea experiment was prepared to test this assumption. It provided for simultaneous measurements of the spectral composition of radiation in the sea, at various altitudes in the atmosphere, and in space. In addition to the Salyut 7 station, two scientific research vessels, an An-30 flying laboratory, and an oceanographic platform positioned at a depth of 32 meters close to the shore took part in it.

When Salyut 7 was passing over the Black Sea, the flying laboratory was traveling along the satellite track, and combined investigations were being conducted from the research vessel "Professor Kolesnikov" and the oceanographic platform. At this same time the vessel "Kometa" was making a high-speed hydrophysical survey of the area. Data from Meteor satellites were also being utilized. Thus a multilevel investigation of the sea and the atmosphere above it was being conducted simultaneously. The principal scientific equipment used in this experiment on board the Salyut 7 station and the An-30 flying laboratory included an MKF-6M multiple-frequency band photographic camera and a modified MKS-M spectrometer.

The completed experiment is one of the stages on the way toward establishing a continuously operating ocean observation system.

\* \* \*

The work being done by cosmonauts is taking on an increasingly more practical thrust from one mission to the next. Many branches and sectors of the economy are awaiting the results of this work. It is not mere happenstance that a large part of the time is devoted to investigation of earth resources.

Visual observations of the ocean surface made from the Salyut 6 station helped discover areas the coloration of which differed appreciably from that of adjacent areas. It was determined that in a number of instances these differences are connected with the clustering of plankton, and consequently are of interest to the fishing industry. The observation methods employed by the cosmonaut crew had never been used before. The obtained result proved unexpected to the experts.

Small high-speed spectrometers were developed to study the detailed spatial and spectral structure of a field of incoming radiation from various water objects. We employed the MSS-2P spectropolarimeter, designed by Belorussian scientists. Working together with specialists at the Cosmonaut Training Center imeni Yu. A. Gagarin, they developed the more sophisticated SKIF spectrometer. Simultaneously with spectrometry, it photographs an object and records support information and accompanying verbal commentary.

\* \* \*

Two months in orbit. We are conducting many new experiments. We are often blazing new trails.

From time to time thoughts about home and our loved ones start to get to us. And then you have the customary terrestrial dreams. You wake up cheerful, in a good mood. Last night I dreamed about fishing. Dawn was a magnificent sight -- I caught a fish weighing about 10 kilograms.

I find that I have developed a liking for technological research. I feel like a space metallurgist. This is nice, a rare profession.

Aleksandr works with the Yelena telescope. It turns out that he has long been interested in astronomy, and yet he is an engineer through and through!

We conducted an experiment on the Pion unit to grow an indium crystal by drawing from a melt through a continuous forming mold. We monitored the process visually and photographed it by motion-picture camera. We produced a quite decent crystal.

We obtained with the aid of a Tavriya unit eight ampules of highly pure preparations -- flu virus antigens. We did this job at the request of the Scientific Research Institute of Epidemiology, Microbiology, and Hygiene imeni Pasteur. Scientists hope to use such preparations to combat allergies and other secondary phenomena connected with employing insufficiently pure and homogeneous substances.

\* \* \*

We have been bothered by deterioration of transparency of the glass in the viewing ports since we began flying long missions. "Pockmarks" from micrometeorite strikes appear on them (one recently struck one of our ports). But the main enemy is a film-like deposit. It causes the quality of motion-picture and still photography to worsen sharply. The experts hold differing

opinions on the nature of this film. Some believe that it is a consequence of the effect of cosmic radiation, while others feel that it is a side effect of operation of the engines. It has been noted that the properties of the station's heat-control coating also change during extended missions.

Attempts were made to remove the film from the viewing port, but to no avail -- it was stuck tight to the glass. Then specimens of various materials were placed on the exterior surface of the station. After exposure they were removed and returned to earth for study. But they failed to provide sufficient information. Nor is it an easy job to take a spacewalk just for the purpose of taking samples.

Now we have Elektrotopograf. It was developed by scientists in the Ukraine. They also selected specimens of structural materials and devised a program for studying these materials. It is no longer necessary to exit the station. We place a platform containing 20 specimens in the airlock and keep it there a specified length of time. We then retrieve it and, using the Elektrotopograf, take an electrotopogram -- an image of electrical and geometric inhomogeneities and defects in a material. We then return the specimens to the airlock. We do this process five times.

\* \* \*

...Autumn is becoming increasingly evident in the station's viewing ports. The Siberian forests are garbed in gold, and more and more fields are being stripped of their grain. The crop has also ripened in our cosmic vegetable garden. We sampled the onions with gusto.

The succession of seasons is clearly visible from space. Earth resources specialists will be pleased -- we have rephotographed the regions which we photographed in summer. This will give them a better understanding of the nature of seasonal changes on the earth's surface.

Progress has arrived with the mail: newspapers and letters. It is fun operating such a gigantic complex: the station and the two spacecraft -- the Soyuz passenger craft and the Progress cargo ship.

One cannot get rid of the sensation of constantly waiting for something -- be it the arrival of the "truck," new experiments, or dynamic operations. What is it, a need for new impressions or the result of a deficiency of information?

The flight engineer is experiencing the same sensation.

\* \* \*

Salyut 7, which cruises above the planet at an altitude of 300 kilometers, is a convenient observation platform. We have collected a great deal of statistical material on earth resources, the state of the atmosphere, seasonal changes of agricultural lands, and the biological productivity of the World Ocean. Photography has been performed simultaneously in six spectral bands. Subsequent computer processing of the imagery will enable us to determine how

to utilize land resources, their mineralogical features, and groundwater resources....

Dozens and even hundreds of photographs have been taken of one and the same regions. Each one contains some new bit of information, since it differs from previous pictures by season, angle, illumination, and weather conditions. Just prior to the mission we were shown how special computers synthesize images and generate diagrams and maps. They are now putting together tectonic maps of the area between the Volga and Don rivers, the Stavropol region, the Urals, the Ukraine, and other regions of the Soviet Union.

It was not so long ago that we gazed in wonder at every fault and dome detected on photographs. Today photography from orbit has firmly taken its place among other methods of geological exploration -- aerial photography, seismic prospecting, and drilling.

Observation from orbit resulted in discovery of a gas condensate field along the lower Volga and a chain of annular structures between the Caspian and the Aral Sea, where oil and gas may also be found. Excellent results have been obtained by utilization of space photographs in studying all of Western Siberia -- this oil and gas region of the Soviet Union. Geologists have given the name "Kosmicheskaya" to one of the structures in southern Siberia.

\* \* \*

We completed mounting and assembly procedures on the station exterior to install an additional solar battery array. There were two EVA sessions, totaling 5 hours 45 minutes in space.

Following the second EVA, when we reported mission accomplished, the mission controllers asked us to pan the solar batteries. I aimed the video camera at the two additional solar panels. You could see little flags at the tips of the panels. Although their purpose was purely technical (they appear when all installation operations have been performed correctly), there was also something symbolic in them. It is gratifying that our crew is honoring the anniversary of the October Revolution under the unique symbol of our creative accomplishments. In the past even removal of a panel carrying scientific apparatus was considered an accomplishment. What we have accomplished this time is incomparably more complicated.

\* \* \*

Our mission is approaching its end. At first we were counting the months, and later we were measuring time to end of the mission in days. Now we are counting the hours. A few more revolutions and the Soyuz T-9 will gently push away from the Salyut 7. I can hardly believe that everything is now behind us and that soon we shall be home.

In order to make the first days on board the station easier for our successors, we drew up an inventory and put tools, instruments, and equipment in their places. We had spent the entire last week shutting down the numerous sections of the orbital laboratory. We mothballed the industrial and

biological equipment, buttoned up the astrophysical instruments, gathered and packed away the scientific research materials. Nor did we forget to leave a message of greeting to the next crew.

We readied Salyut 7 for autonomous flight.

We put on our travel pressure suits. The flight engineer was the last to leave the station, as is proper. We took one last look at our space home, and switched off the lights.

Thank you, Salyut 7, and bon voyage!

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